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The contribution of pre-hospital integrated care pathways on improving the clinical effectiveness of emergency ambulance managed care

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"This thesis is submitted in part fulfillment of the requirements of the University of Glamorgan for the degree of Master of Philosophy"

"I declare that this thesis is the result of my own independent investigation and that all sources are duly acknowledged in the biography"

Signature _____ David Ellis

CONTENTS

PUBLISHED ARTICLES

Ellis, D (1998) Pathways to effective integrated pre-hospital care: *Journal of Clinical Effectiveness;* Vol. 3 Number 4; 166-169

Ellis, D (1998) Integrated paramedic care – a vision for the future: *British Journal of Health Care Management;* Vol. 4, No.2 86-88

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SUMMARY

Currently an emergency ambulance staffed by a paramedic and emergency medical technician are responded to every '999' call received regardless of severity or type of call. Evidence has shown this to be necessary and effective for a number of clinical conditions and prioritisation systems have been introduced by every ambulance service in the UK to ensure that those with life threatening conditions have priority above more trivial calls. Once attended by paramedics, unless the patient refuses to travel, they are transferred to hospital due to a lack of alternatives, despite ever increasing demands on both the ambulance service and A&E departments. This study challenges the automatic transfer of patients to accident and emergency departments and suggests an alternative through improved paramedic protocols that would enhance the development of integrated pre-hospital care pathways. The skill levels of paramedics have proven to be effective in the treatment of a number of serious conditions to the extent where the need to transfer the patients can be questioned. However the existing method of measuring performance of ambulance services continues to be speed of response with no measurement of paramedic effectiveness.

There have been several studies that debate the appropriateness and inappropriateness of patients being transferred to hospital following an emergency but none could be found that considers how improved paramedic protocols could contribute to the use of integrated care pathways as a means of treating and managing patients in primary care. Government policies dictate that health professionals should work together to both minimise resources and provide clinically effective services and if current arrangements for ambulance services are considered then clearly alternatives must be found that provide a better measure of ambulance service performance.

This study suggests that by improving paramedic protocols they can form part of integrated care pathways enabling an alternative to be developed rather than automatic transfer of patients to hospital. Integrated care pathways define the optimal care process, sequencing and timing of interventions and are widely used in hospitals by doctors, nurses and other healthcare professionals for a particular diagnosis or procedure. Although their use is growing in primary care they have yet to be

introduced into pre-hospital care. It was felt unlikely that integrated care pathways could be introduced without considering organisational aspects, as ambulance service structures are largely developed to meet response standards. Therefore it was necessary to consider a quality framework that could be used to underpin the development of pre-hospital integrated care pathways that would enable effective audits measuring their effectiveness, to be undertaken. Donabedians framework of structure, process and outcomes was used as a model with review criteria developed enabling the differing aspects of ambulance services performance to be measured.

As the ambulance service is driven by clinical protocols developed by clinicians it was recognised that if any change is to happen clinical acceptance must be sought. To ascertain clinical acceptance a workshop was held allowing clinicians to select those clinical conditions that they felt could be appropriately managed by the pre-hospital integrated care pathways with either referral to the GP or primary care team or indeed could be left without referral. Further acceptance was sought through a questionnaire asking paramedics, nurses, GP's and A&E consultants to give their opinions covering a range of issues concerning the development of pre-hospital integrated care pathways.

There was a consensus that pre-hospital integrated care pathways could provide an alternative to the automatic transfer of '999' patients to hospital. Clearly there are benefits for the ambulance service in that resources will become available quicker for other emergencies, particularly in rural areas, with demonstrable cost savings. There are also benefits for secondary care in that cases that would be labelled inappropriate for A&E would be managed by primary care where it could be argued the patient is more appropriate for treatment and management. Although there were concerns among some GP's that this concept could increase their workloads as resources are unlikely to be moved from secondary care, however evidence suggests that the increased workloads may not be significant.

There are issues such as clinical risk, medico-legal implications and patient acceptance that are beyond the scope of this study and it is accepted that further research may be necessary before any change could be considered.

CHAPTER ONE

1. INTRODUCTION

The history of the modern ambulance service can be justifiably accredited to Napoleon Bonaparte and his Surgeon-General Dr. Dominique Larrey who showed extraordinary compassion for wounded French soldiers and provided 'ambulances' which took the wounded from the battlefield to field hospitals where they could be treated for their wounds. Other conflicts such as Korea and Vietnam have contributed to the development of pre-hospital care interventions, which have ultimately, led to today's paramedics.

1.1 The Ambulance Service in the UK

The history of the UK Ambulance Service is comparatively short when compared to the rest of the NHS. Although the National Health Service Act (1946) meant a more co-ordinated approach to health care, ambulance provision remained ad-hoc, with counties, towns and villages organising their own facilities through county councils. These were uncoordinated with services provided either by voluntary services such as St John (St Andrew in Scotland) or by the provision of ambulance cover on a part-time basis by those with other jobs. In some parts of South Wales and Northern England miners paid a penny a week subscription for ambulance cover, which was 'owned' by the mine for the sole purpose of transportation to a hospital or GP facility.

These arrangements continued until 1974 when the various local services amalgamated to become the NHS ambulance service. The role of the service was to ensure that free ambulance transport was available to take patients to and from treatment centres with no measures of efficiency or effectiveness considered. Probably the most significant change was in 1966 when the Ministry of Health commissioned a working group, chaired by E.L.M.Millar to report on ambulance training and equipment. The Millar report (1966) arguably became the most influential document ever to be published on the subject of the British ambulance service. It shaped the future direction of the UK ambulance service for the next two decades and beyond and for the first time the task of the ambulance service was clearly defined as:

> *"To transport patients to treatment centres without avoidable deterioration or unnecessary delay. They must have sufficient background knowledge to*

> *make certain vital decisions with confidence and act accordingly, particularly in the light of changes in the patients condition, to be able to recognise and report helpfully on various aspects of the case and work generally in accordance with the policy of the accident and emergency services in the locality".*
>
> (Millar 1966)

Prior to Millar, skill levels were basic with only a St John first aid certificate required which enabled staff to undertake limited skills such as basic Cardio Pulmonary Resuscitation (CPR) and control of haemorrhage. Millar made many recommendations including the introduction of a basic 6-week qualifying course for all staff engaged in accident and emergency duties, which was later to become 12 weeks. An inventory of essential equipment was also introduced in order to establish a minimum standard throughout the UK.

Although the Millar report recommended minimum standards of equipment, additional equipment was often purchased through public donations and localised training. This meant that ambulance services became fragmented in delivering patient care. More affluent areas such as those in the Southeast were able to provide more equipment, whereas other areas such as South Wales made do with basic equipment resulting in inequity of care. This continued with services adopting differing standards of extended care encompassing, intubation, infusion and defibrillation skills, which was not rectified until 1986 when the National Health Service Training Directorate (NHSTD) set the standard for extended training, which all services had to comply with in order to gain recognition of extended skills (Wright 1994).

More recently, the recognition of ambulance service professionalism has culminated in the state registration of paramedics under the control of the Health Professions Board (formerly the Council for Professions Supplementary to Medicine) and although ambulance crews have for many years undergone extensive training in ambulance techniques and paramedic skills, it is only recently that undergraduate programmes for education of a small number of paramedics have been introduced

Despite the essential and often life saving interventions at the scene and during the journey, the focus has remained on the ambulance service's "delivery to hospital" function. Recent technological advances and improvements in paramedic skills, however, are beginning to raise questions regarding whether such a focus is still appropriate (Snooks 2000) and a recent Department of Health report on the future of ambulance services (DoH, 2001) recognises that patients would benefit from the ambulance service playing a much greater role in the provision of health care in the future.

1.2 Measuring Performance

In 1974 the government commissioned a report from Operational Research Consultancy (ORCON), which analysed and produced emergency response times for three categories, urban, rural and metropolitan. These response times did not take into account severity of clinical condition or injury type. Consequently all 999 calls were treated equally. Although at the time these were not adopted by all services they were significant, as they were to become standard indicators. This was reviewed in 1988 with slight modifications but did not detract from the fact that efficiency was measured by response times.

Recognising that ambulance services could do better, the government commissioned a report (Calman 1996) that identified that an alternative system of triage was needed and since April 2001 emergency calls have been categorised according to clinical need. Although there are different ways in which this may be done, the Welsh Office (now Wales Assembly Government) mandated prioritising calls into one of two categories with response standards with further work being undertaken as a possible 3rd.

Category A - Immediately life threatening requiring an appropriate response in 8 minutes.

Category B - All other emergency calls requiring a response in accordance with current Patient Charter requirements i.e. 95% response in 14 or 18 minutes or 21 minutes.

Category C - Further work is being undertaken into the feasibility of introducing a category of calls regarded as not being serious (a proposed Category C).

Research by Sheffield University indicated that the proportion of 999 calls for each category could be in the region of 25% for Category A, 60% for Category B and 15% for Category C (DoH 1996). All ambulance Trusts were expected to respond to 75% of Category A calls within 8 minutes, by December 2002.

Arrangements are currently in place whereby the caller to the '999' system will be asked a series of questions designed at ensuring that the ambulance is dispatched with the appropriate urgency dependent on clinical condition. These questions are not designed to slow the process but enable the controller to give advice on the management of the patient prior to the arrival of the ambulance. This advice has proven to be beneficial and undoubtedly contributes to a more clinically effective outcome for the patient. However this aspect of performance is not measured and to a large extent is disjointed from the interventions that the paramedic undertakes on scene. Although these interventions may be the subject of local ambulance service audits their clinical contribution to the outcome is again not considered nationally.

1.3 Challenges to current arrangements

At present there are two rules of ambulance provision, which are being challenged. The first is the automatic dispatch rule which states that the service must respond to all emergency '999' calls by dispatching an ambulance regardless of the nature of the problem. Research is currently examining the effects of introducing systems of triage in which ambulance control staff categorise calls according to pre-defined criteria and dispatch an ambulance only where the need for one is indicated (DoH 1996).

This thesis is concerned with the second rule, which states that ambulance crews must transport the patient directly to an Accident and Emergency (A&E) regardless of the condition of the patient or the care given on scene. Nicholl (2000) has argued that this is directly contributing to inefficiencies in service delivery through the wasteful use of scarce resources (Nicholl 2000).

The increasing professionalism of paramedics as pre-hospital care providers and the interrelation between both secondary care clinicians and more recently primary care providers, suggests that alternatives to automatic transfer to hospital might be found that may not only benefit patients but also free resources while at the same time keeping

pace with the increasingly promoted notion that more health care should be delivered in the community. Moreover, it is also consistent with the current shift in emphasis away from patients having the automatic right to choose how and where they access the health service (Woollard 1999). Alternatives such as NHS Direct have recently been implemented whereby the public are directed towards more appropriate levels of care either by telephone advice, reference to their GP or attending the local pharmacy.

For ambulance services to interrelate more closely with secondary and primary care services, boundaries are likely to need to be removed with all those concerned working towards the same outcome, that being the most clinically effective outcome for the patient with the most effective use of resources. Existing arrangements have the potential to frustrate integrated working arrangements due to differing objectives across disciplines. For example in some areas of the UK hospitals are experiencing bed capacity difficulties as a result of beds becoming blocked with A&E departments unable to accept emergency '999' cases causing ambulances to be delayed in offloading emergency patients, some are diverted to other hospitals, however this has the potential to cause problems for these other hospitals. GP's arrange for patients to be admitted to hospital and allow the ambulance service up to 2 hours to get the patient to hospital dependent on the patients clinical condition, however due to the bed block GP's are contacted for more time and in the majority of cases are reluctant to increase the time because of 'clinical risk' issues as they would not have seen the patient since their first contact. Ambulance services because of protocols upgrade the call to an emergency response due to the time allowed expired knowing that once they arrive at the hospital then they potentially will be delayed in offloading the patient.

1.4 Alternatives to automatic delivery to hospital

Several studies have identified that there are ranges of clinical conditions that lend themselves to alternatives to secondary care through the intervention of paramedics (Weston 1990, Steel 1992, Billittier 1996, Socransky 1998, Hauswald 1999, Hensher 1999, Snooks 2000). At the same time, there has in recent years been a profusion of alternative facilities to accident and emergency departments such as minor injuries units, walk in centres and NHS Direct. Despite this, patients attended by the ambulance service are still mainly taken to A&E departments, although the Department of Health guidelines have been amended to omit the phrase 'normally to the nearest hospital'

(DoH, 1978). Indeed, with the growth of specialisation and reconfiguration of hospital services, the nearest hospital may no longer be able to deliver the best treatment.

Other options may be more appropriate for at least three types of patient:

1) Patients with minor injuries may be dealt with in minor injuries units (MIU), especially in rural areas. Although some of these units (14 out of 58 according to a survey by Woollard, 1999) do not accept ambulance patients, the ambulance service has in some cases negotiated access for some patients whose clinical condition can be managed by MIU's. There are two main benefits to this practice: the ambulance becomes available sooner for other calls and the patient has a shorter wait in MIU than in a full A&E department, and possibly a shorter journey home.

2) Patients already in the care of a NHS consultant, such as expectant mothers and those with chronic conditions such as asthma, may already be receiving hospital care. In these cases it may be more beneficial for these patients to attend the same hospital where they normally receive treatment, even if it is not the nearest.

3) Patients with conditions requiring highly specialist skills such as those with burns or major trauma may need to be taken to a specialist centre rather than to a local A&E department. The decision, about best destination is largely a clinical one. It hinges on the rate of deterioration in the patient's condition, the relative time of the two journey options, the likelihood of specialist skills being needed and the consequences if they are not available. Ambulance crews increasingly have to make such complex judgements but do not currently have the autonomy about where patients should be treated or referred to.

1.5 Integrated Care Pathways

Integrated care pathways (ICP's) are a documented sequence of clinical interventions, placed in an appropriate time frame, written and agreed by a multi-disciplinary team. They help a patient with a specific condition or diagnosis move progressively through a clinical experience to a desired outcome. They provide patient focused care with benefits to the patient, family and members of the multi-disciplinary health care team (Kitchener 1995). Perhaps more importantly they encourage closer collaboration

between all members of the health care team who are responsible for different aspects of the care programme for patients by ensuring the continuous evaluation and improvement of clinical practice. A report by the Clinical Resource Utilisation Group (GRUG) in 1999 showed that pathway management is successful with over 75 Trusts investing at the time in the development of integrated care pathways covering both acute and community units.

One potential weakness with current ICP's, however, is that their concern with the clinical experiences of patients fails to include an important part of the clinical experience of emergency patients - the attention they receive from paramedics. If ICPs could be extended into the pre-hospital period, then the contribution of the paramedic to the ultimate outcome of the patient could be assessed as part of a wider performance measure.

1.6 Extending ICP's by replacing guidelines with protocols

Use of clinical guidelines is a major feature of ICP's, which could cause problems if ICP's are to extend to include the pre-hospital period. Guidelines allow health professionals a degree of discretion in their application, which would not currently be acceptable given the limited (although growing) professional training given to ambulance crews. This problem might be overcome if during the pre-hospital period guidelines are supported by 'protocols', which enable decisions of what to do in particular circumstances to be determined by algorithms without the degree of judgement that guidelines require.

The extent to which paramedics should have discretion to use their judgement in determining the most appropriate place to take the patient (if anywhere) is a highly contentious issue as current paramedic 'decision making' is largely controlled by protocols which dictate appropriate actions in given circumstances. Nicholl (2000) argues that protocols are used widely in the ambulance service because paramedics are not usually regarded as independent practitioners with professional responsibility for their patients. It is this distinction between guidelines and protocols, which arguably sets the ambulance crews apart from other health service professionals.

Anecdotal evidence, however, suggests that in some instances ambulance crews can indeed exercise judgement by seeking permission from the control room to take a patient to a more distant hospital. Although ambulance controls cannot directly give permission this can be done via accident and emergency departments. Although this can put the crew in a difficult position if the patient's condition deteriorates en route, anecdotal evidence also suggests that some services are introducing protocols so that the crews are not left with the responsibility for making these difficult decisions. The underlying danger in adopting such changes is that they may be allowed to develop in isolation from the other parts of the health services. This thesis will argue that to achieve a more cohesive service it will be necessary for the ambulance service to develop in an integrated way with other parts of the health service organisation.

Ambulance service paramedics are trained to follow protocols taken from evidence-based guidelines developed by JRCALC. These are purposefully narrow, as paramedics would not have access to the necessary diagnostic tests needed to work to guidelines. Formerly protocols were developed by professional consensus and were incorporated into the Institute of Healthcare Development (IHCD) basic and paramedic training manuals, which were used as the basis for training. This change happened in early 2002 and reflects the rapid continual development of pre-hospital care. As paramedics follow protocols they are arguably best suited to follow a 'plan' or pathway of care, as their training emphasises no deviation from the protocol thereby minimising any potential clinical risk. Current pre hospital care consists of 'informal' pathways i.e. pre arrival instructional algorithms, response standards and on scene treatment protocols, which consider the time elements of each component. Pre arrival advice is given in a logical sequence whilst the paramedic crew are mobile to scene; response standards are within national requirements with on scene treatment protocols being developed by some services to not exceed certain time delays for non-entrapments. The missing piece of the jigsaw is what the paramedic could potentially do to improve the management of the patient to ensure that the care is clinically effective such as having the autonomy to make decisions regarding where the patient may be most appropriately treated.

1.7 From Clinical Guidelines to Protocols

The development of clinical guidelines became a major health care quality issue in the 1990's. Guidelines are produced by clinicians for clinicians (that is doctors, nurses, and other professionals directly providing clinical care). While in the past these have been developed mainly by consensus, Grimshaw (1993) suggests that current interest is due to several new factors. Firstly, only recently has a method been suggested for the development of systematic guidelines based on evidence, which may offer one approach to incorporating the findings of research into routine clinical practice. Secondly, evidence has now become available to show that guidelines can encourage improvements in performance when coupled with effective implementation strategies. Thirdly, the NHS Executive has recognised the potential for clinical guidelines in improving clinical effectiveness if incorporated by purchasers and providers in contracts for care. Many, however, have pointed out that the benefits of guidelines do not automatically follow since changes in the performance of clinicians depend not only on the guidelines themselves but also on the methods used to encourage their acceptance and use (Lomas 1989, Jones 1993, Neville 1993).

Despite the potential for integrated care pathways to inhibit the professional autonomy of clinicians their growth and popularity outside the pre-hospital setting is evident. What are clear are the opportunities for ambulance services in that they allow the translation of national guidelines into protocols for pre-hospital care and their subsequent application to clinical practice (Campbell (1998). Paramedics would follow protocols and the development of integrated care pathways may provide the opportunity for ambulance services to become a key player in providing more effective care through protocol development that meets the requirement of integrated care. The introduction of integrated care pathways could enable ambulance services to review structures enabling the concepts of quality management to be considered, as pathways would require continual audits to be undertaken to identify what is effective and that what is ineffective. Whilst the development of pre-hospital integrated care pathways is unlikely to reduce demand on the ambulance service, they have the potential to divert patients to the most appropriate medias for care and have the potential to reduce 'inappropriate' attendances at accident and emergency departments. Although ICP's are a relatively new clinical process improvement tool that are used widely in hospitals in the USA,

Australia and the United Kingdom (Cheah 1998) they have yet to be introduced into pre-hospital care.

Extending integrated care pathways to the pre-hospital period would potentially have the following advantages: -

- Patients treated as emergencies may be left at home following treatments by paramedics working to agreed protocols

- Pressure could be reduced in A&E departments due to a more managed system of demand.

- Patients would be admitted to the most appropriate treatment centre which may not be an accident and emergency department

- Provides an opportunity for more integrated care with primary care teams as opposed to automatic dispatch to A&E departments.

At the same time it would have great benefits to the ambulance service in that: -

- It may be possible to free emergency ambulance crews to deal with more pressing emergencies or to release them to be available for other emergency calls.

- Capacity to measure performance in a better way could be introduced that focuses on clinical effectiveness rather than just response standards

- There would potentially be improved opportunities for staff to improve diagnostic skills

For this to happen clinical conditions need to be defined that can be developed into pre-hospital integrated care pathways and protocols developed from widely accepted guidelines. Relationships between ambulance personnel and clinicians are generally very good with positive support for most initiatives progressed by ambulance services. However, initiatives involving changing practices, new skills or techniques have

historically been led by clinicians therefore for the ambulance service to move forward clinical acceptance have to be determined.

1.8 Research Aims

The overall aim of this dissertation is to examine the potential extension of ICP's to the pre-hospital setting with particular focus on the extent to which acceptable protocols for use by paramedics can be developed from guidelines.

1. to review the literature on integrated care pathways and more generally on evidence of how changes to ambulance services can improve clinical outcomes

2. to consider changes to the National Health Service and how conducive or otherwise they are to the introduction of pre-hospital integrated care pathways.

3. to assess clinical opinion as to whether the principle of pre-hospital integrated care pathways is an acceptable alternative to automatic delivery to accident and emergency departments.

4. to identify those patient categories that could be managed with an alternative disposition.

5. to consider criteria for draft pre-hospital care pathways that enable integration with other health care providers.

6. to develop preliminary pathways for selected clinical conditions for future evaluation.

The dissertation considers the role of the ambulance service and how changes to emergency healthcare are influencing pre hospital care. It also looks at how the ambulance service has developed and how it has embraced concepts such as clinical audit and clinical effectiveness together with how these have influenced pre-hospital care and the development of protocols used by paramedics. There has been significant development regarding the skills of paramedics, which are considered as being fundamental to the hypothesis.

The role of clinical audit is explored in detail together with the distinction between clinical guidelines and protocols and how these fit within the pre-hospital care environment. More importantly is the evidence from guidelines that influences the development of on scene paramedic protocols and other aspects such as dispatch protocols and how these have been used to construct preliminary pre-hospital integrated care pathways for consideration.

It is recognised that quality is an issue facing all health providers and issues regarding quality have been considered so that pre-hospital integrated care pathways can be designed using well-established principles of quality management.

In order to address the hypothesis, it was recognised that clinical support will be needed from a wide range of clinical professionals who concurred that the concept of integrated pre-hospital care pathways was a viable concept. A range of methodological techniques was applied to assess this support.

Although the hypothesis has excluded issues such as medico-legal implications and has not focussed too much on clinical risk it has recognised that there may be resource implications and has sought to identify what these may be.

The following chapter considers how pre-hospital care interventions have impacted on clinical outcomes for specific clinical conditions. It considers how the ambulance service is used and the role that it plays in the delivery of effective healthcare.

Chapter three looks at the development of the ambulance service within an ever-changing NHS. It considers how changing health care policies have influenced (or not) the way the ambulance service has evolved and suggests how the continuing development of paramedics can be better integrated with other health professionals, which is vital if the concept of integrated pre-hospital care pathways is to be realised.

The fourth chapter looks at quality and its assessment and in particular the importance of a quality framework that underpins integrated care pathway developments. It considers the current arrangements where speed of response is the only reportable

quality indicator and how the focus on outcomes provides ambulance services with the opportunity to consider alternatives to existing evaluations of service delivery.

The development of integrated care pathways is reviewed in chapter five and how these have been used to improve clinical outcomes for patient groups and how they provide a means of managing care. Although not a means for reducing demand for the ambulance service they can assist in ensuring that patients are taken to the most appropriate location for care thereby potentially reducing demand at A&E departments. The structures of integrated care pathways are considered and how ambulance services can fit within this concept.

Chapter six shows the methodology applied. There were two phases to the study as follows: -

Phase 1

In order to determine the range of clinical conditions to be considered it was necessary to:

- Undertake a review of clinical conditions and injuries treated by the ambulance service and consider their effectiveness

This identified best practices and skill gaps, which were subsequently analysed by a working group consisting of both clinicians and non-clinicians.

- Clinicians selected specific conditions for further study and scored conditions against agreed criteria
- A sample of 200 health professionals was used to obtain a consensus view of the clinical conditions selected.

Phase 2

Once conditions were selected: -

- Evidence on care pathways was reviewed.
- A series of models for each clinical condition were developed

Chapter seven considers the results of the methodology applied.

Chapter eight considers the resource implications using accepted practices to compare alternative models of care against traditional methods of transferring patients to accident and emergency departments. Patients were audited to assess the numbers who met the criterion. The Welsh Ambulance Services NHS Trust clinical audit database was used for this process

CHAPTER TWO

2. PRE-HOSPITAL CARE REVIEW OF THE LITERATURE

A literature review was undertaken on the impact of pre-hospital care interventions on clinical outcomes and on the effect of service delivery on patterns of emergency services across the pre-hospital/hospital interface. It was not intended to undertake an in-depth literature review but to establish what is known about the appropriateness of ambulance attendance, ambulance delivery to A&E, the effects of patients being managed in alternative settings and the involvement of clinicians in developing protocols. This review was restricted to studies undertaken in the UK and the US as practices are similar in the two countries with the US widely recognised as the forerunner to paramedic and pre-hospital care development.

Studies have been considered to determine whether any similarities exist that could be due to service configurations or whether wider issues such as the way health care is delivered influences the decisions to call for an ambulance. Sources included a range of electronic databases: Medline; HealthStar; DHSS-Data; the Kings Fund, London and Library databases such as the Cochrane library. Electronic searches were supplemented with handsearching of key journals including Emergency Medical Journal, Journal of Pre-Hospital Care, Ambulance UK Journal, Annals of Emergency Medicine, Journal of Academic Emergency Medicine and Journal of Nursing Administration. Advice from subject area experts and relevant reference lists and bibliographies were also used. The searches located several hundred items the majority of which focus on trauma and cardiac care in the pre-hospital care setting.

Literature on the ambulance service has tended to focus on three main areas:

- whether the service is appropriately used
- the effectiveness of paramedic interventions, and
- the paramedics ability to adhere to protocol

2.1 Appropriate Use of Emergency Health Care Services

This section deals with 'appropriateness' and considers with why people call 999 for an ambulance and considers comparisons with those who attend A&E departments, the

rationale being that both are places where emergency treatment is undertaken. Both are easily accessible to the public who are unlikely to be denied treatment for whatever ailment or injury they present with. It could be further argued that the public see the ambulance service as an extension of the accident and emergency department and therefore analysis and theories regarding 'inappropriate' use of A&E departments could be applied to ambulance services. It should be noted, however that no specific literature could be found which supported this argument.

The debate regarding appropriateness considers several factors such as the patients clinical condition, differing perspectives between patients and clinicians, whether the patient was discharged with no follow up treatment, the patients age, social status, whether self referred or referred by their GP and the availability of other transport or other alternatives. What was clear is that no agreement could be found as to what constitutes appropriateness or indeed inappropriateness

The question of appropriateness is seen by Brook (1994) as being "the next frontier" in the development of clinical practice. He argues that firstly, there is too much information about medical practice for any doctor to assimilate all the information relevant to their practice. Brook believes therefore, that it is impossible to "practise good medicine without additional help". Secondly, for this, and other reasons, many patients receive care that is "inappropriate" (contributing to over use of health care) and many others are not offered "appropriate" care (under use of health care). Thirdly, the appropriateness of care can be measured and, finally, the application of measures of appropriateness can reduce or eliminate both over use and under use of medical interventions. A more recent argument by Lambert (2003) supports Brooks. Lambert believes that there are two distinct types of appropriateness; appropriateness of care itself and the appropriateness of the setting within which that care is provided. The definitions offered by Lambert are that appropriateness of care itself should be related to effectiveness in that the expected benefit outweighs the expected harm to the patient. Therefore care is labelled necessary if it has to be offered to the patient for medical or other reasons. If care is provided to a patient for whom it is not necessary, this is defined as "overuse". If care is not offered to a patient for whom it is necessary, it is termed under use. The final point that Lambert makes is that the appropriateness of the setting in which care is provided is related to cost-effectiveness. This type of

appropriateness is determined by whether the patient's clinical characteristics, and the services required for this care, match the setting in which the care is provided. It is this belief that can be applied when considering the appropriateness of ambulance service use.

2.1.1 Appropriate use of the ambulance service

The literature regarding appropriate use of the ambulance service has developed from a number of sources, both medical and sociological, most of which focus upon those who attend hospital via the ambulance service and those who self present. There appears to be a diversity of systems that contribute to emergency health care with patients often blamed when a case suitable to be seen and treated at home by a GP presents to another agency (Cooke 1998). However, as Cooke states, the problems encountered in the UK are similar to those in many other countries with the patient's first action being important in determining the type of care that they will receive.

The interpretation of whether or not ambulance service use is necessary is based on several factors such as demographic information and availability of alternative means, however the main focus is medical need. Although studies have been undertaken with differing methodologies, there is evidence to suggest that services are in many cases inappropriately used.

An early study by Morris (1980), undertaken in the UK, represents perhaps the first detailed study of the use/abuse of ambulance services. The study analysed all patients taken to an A&E department during March and April 1978 using clinical diagnosis as the prime indicator, with age and social state of the patient also considered. Comparable studies undertaken by O'Leary (1987) (UK), Gardner (1990) (UK), Koenig (1996) (USA) and Billittier (1996) (USA) also cite medical diagnosis as the prime indicator and include other criteria such as whether the patient had tried to contact their GP. Excluded from these studies were, 'alcoholic intoxication' and 'no pathology', on the premise that alcoholic intoxication could mask other clinical signs and symptoms of injuries or underlying medical condition, with no pathology being self-evident. Morris (1980) identified that from the total number of patients (n =1000) included in his study more than half (51.7%) of all ambulance journeys were unnecessary. All but the most trivial head injuries were considered 'justified' whereas minor lacerations to the head

were usually not. Most minor injuries in the elderly 'justified', an ambulance whereas examples of unnecessary calls were sprained ankles of some day's duration, nausea, and minor epistaxis.

A more recent study by Richards (1999) (USA) concluded that inappropriate ambulance use presents a significant problem from both Emergency Medical Services (EMS) providers and patient perspectives. Richards found that certain patient characteristics are associated with a higher probability of appropriate and inappropriate uses of EMS transport and that a large number of patients transported by ambulance have alternative means of transportation but elect not to use them. The patient characteristics associated with EMS provider perception of a typical emergency were male, age >51 years, higher education, chest pain/cardiac complaints, shortness of breath/respiratory complaints, and Medicare insurance. Characteristics significantly associated with patients who perceived themselves to have true emergencies were black ethnicity, higher education, shortness of breath/respiratory complaints, and Medicare insurance, but as Medicare is for those on low incomes the true association may be between income and ambulance use. This certainly appeared to be the case in studies by Brown (1993) (USA) and Lyn (1999) (USA). Brown (1993) concluded that ambulance misuse might be related to the broader problem in the provision of care to the poor or otherwise under served with Lyn (1999) finding that the 0-19 year age group and self-pay status were associated with inappropriate use.

A UK study by Gardner (1990) included patients who had been visited by a General Practitioner and who had ordered an emergency ambulance to attend. However unlike Morris this study sought to categorise patients purely on medical need without allowing for age or social conditions of the patient. If these other factors had been taken into consideration then it would be expected that the inappropriate call-out rate might have been reduced. From the total number of patients analysed (n = 289) it was found that 38% had not made a justifiable call.

Pennycook (1991) (UK) compared general practitioner and '999 'calls. He found that almost half (49.8%) of patients attended after'999' calls were discharged with no follow up. The conclusion reached was that many of these journeys represented inappropriate use of the emergency ambulance service. The study demonstrated that there are

differences between patients who have initially seen their GP (38%) and those who have not (999 calls). What Pennycook found was that '999' calls tend to involve younger patients, 46.7% being under 40 years old, compared to 23.6% of those referred by their GP. Similar findings were identified in America by Billittier (1996), who found that patients <40 who had Medicaid coverage were associated with medically unnecessary ambulance use.

Age would also appear to be a factor regarding appropriate use of the ambulance service, though methodologies vary, O'Leary (1987) found 86% of patients over 70 justified a call whereas 47% of those under 25 were unjustified, although O'Leary believed that elderly patients were justified purely for social reasons. Richards (1999) found that of 887 patients 501 were deemed to be appropriate and represented true emergencies by clinicians, whereas 689 patients believed their medical problems were true emergencies. Part of the study was to evaluate patient demographic information and availability of alternate means of transportation to the hospital and it was interesting to note that a significant number of patients (n=415, 47%) had access to alternative transport. Richard's concluded that inappropriate ambulance use is a significant problem from both provider and patient perspectives and that certain patient characteristics are associated with a higher probability of appropriate and inappropriate uses of ambulance transport.

Those who attend A&E by ambulance are not necessarily the originators of the '999' call with a significant number of calls made on the patient's behalf. A study by Gardner (1990) found that people such as teachers might order ambulances to cover themselves, and that friends and passers-by are not good judges. With a lack of basic first aid knowledge they 'panic' into ordering an ambulance to attend in case there is a problem. Whilst this ensures that those patients who require an ambulance receive pre-hospital care and possible secondary care those who are transported to A&E and do not receive care will be labelled as 'inappropriate' cases. However again this must be viewed in the context of no alternatives being readily available. Although similar findings were found in a study by Little (1998) (UK) what was more significant was that it was found that approx. 31% of 999 calls were made because the patient had no transport alternative.

Morris (1980) (UK) observed that from those patients analysed *(n=1,000)*, relatives made most 36% (358) of the 999 telephone calls with only 49 calls made by patients. Neighbours were responsible for 177 calls; employers 51, with passers-by accounting for a total of 113, a variety of other calls were made by police, teachers and employers. Over half the calls (593) boarded the ambulance at their homes, 57 at their place of work and a further 21 at schools.

There are several issues that emerge from the literature review such as what constitutes appropriate use of ambulance services, the differing perceptions between professionals and patients and the role of GP's in acting as a filter to ensure that the ambulance service is used appropriately. The question of appropriateness of uses recedes, as not only is it difficult to measure but also of little relevance (Snooks 1998). Snooks argues that the question should become " how can ambulance services best plan the cost effective provision of pre-hospital care so that varied healthcare needs expressed by the general public through 999 calls receive an appropriate response?". She concluded that ambulance services need to understand their workload and factors which affect all types of demand, not in terms of appropriateness or otherwise, but in terms of patient type and condition, and social as well as clinical need. However it is recognised that in order to plan the future delivery of emergency care an understanding of the factors, which influence the public to call 999, must be gained (NHS Executive 1997).

2.1.2 Appropriate use of A&E

It was assumed that once the National Health Service was established, the presence of general practitioners would potentially act as a filter in the community deterring the public from inappropriately using the accident and emergency department (Fry 1960). This has not been the case with approximately half of the patients attending accident and emergency departments in cities and urban areas presenting with problems that could have been treated in general practice (Cohen 1987). Dale (1991) believes that there are several reasons to consider this a problem. First, these patients compete for A&E resources with patients whose need for acute hospital care is greater. Second, the type of consultation in A&E departments may not be appropriate to their problems. When seeing comparable patients with non-acute problems, A&E doctors are less likely to discuss social and work-related topics, tend to use a less ' patient-centred' approach, and spend proportionally less time listening to the patient than do general practitioners. Furthermore, costs of treatment

in A&E may be higher than in general practice; junior casualty doctors have been found to prescribe more drugs and to make more referrals to out-patient departments and on call teams than GP's seeing comparable non-urgent cases.

Many studies have shown that a high proportion of patients attending A&E departments have only trivial or non-urgent complaints (Driscoll 1987). Although A&E staff treat these 'inappropriate' attendee's they recognise that this detracts from the care given to more serious cases. Increasing attendances in A&E departments have been attributed to a greater number of patients presenting with minor injuries (Sanders 2000). Sanders argues that A and E staff believe this type of patient is suitable for primary care, and is 'inappropriate' for A and E management. Thus, A and E staff find 'inappropriate' attendees time-consuming and unrewarding, and are less motivated to help them, whilst 'inappropriate' patients believe they have attended the appropriate service for their medical needs and expectations.

Lewis (1981) (UK) argues that the continued free access to A&E department by the public has resulted in diminished control by the health care professions. He further states that it is considered one of the few areas of the hospital where referral from another doctor is not required; that is members of the general public are not invited into the hospital by the medical profession. The perceived availability, accessibility, competence and convenience of general practitioner services are some of the reasons, which it is believed influence the use of accident and emergency services (Dale 1992). Patient surveys undertaken by Morgan (1974) and Wood (1986) suggest that the perceived need for urgent care is probably more influential than dissatisfaction with general practice *per se*.

There is doubt however that the increasing availability of alternative services offering first contact care for non-urgent health problems, is likely to have little impact on the demand for A&E services (Coleman 2001). Coleman's study sought to estimate the potential of general practice, minor injury units, walk in centres and NHS Direct to reduce non-urgent demands on accident and emergency (A&E) departments taking into account the patient's reasons for attending A&E. A questionnaire survey and notes review of 267 adults presenting to the A&E department of a large teaching hospital in Sheffield, England, triaged to the two lowest priority treatment streams, was conducted over seven weeks. Using defined criteria, patients were classified by the suitability of the presenting health

problem to be managed by alternative immediate care services or only by A&E, and also by the likelihood, in similar circumstances, of patients presenting to other services given their reasons for seeking A&E care. Full data were obtained for 96% of participants (255 of 267). Using objective criteria, it is estimated that 55% (95% CI 50%, 62%) of the health problems presented by a non-urgent population attending A&E are suitable for treatment in either general practice, or a minor injury unit, or a walk in centre or by self care after advice from NHS Direct. However, in almost one quarter (24%) of low priority patients who self referred, A&E was not the first contact with the health services for the presenting health problem. The reason for attending A&E cited most frequently by the patients was a belief that radiography was necessary. The reason given least often was seeking advice from a nurse practitioner.

2.2 Patient Perception

It was interesting that the literature search failed to identify any studies as to why people use the ambulance service particularly when other studies found significantly high numbers who were not deemed to be emergencies. The way that the ambulance service has evolved with all calls responded to might be one theory as to why the ambulance service is used inappropriately. Ambulance services appear to have strong community ties with support particularly for fund raising when items of equipment are required such as defibrillators during the early 1980's and when raising funds for developments such as helicopters, which may be beyond the financial capabilities of health authorities. There does appear to be a strong element of community expectations. For example Pugh (1985) argues that the emergency ambulance service should be seen as a measure of community expressed need for emergency medical care. This is by no means a universal view and others such as Pennycook (1991), suggest that community expressed perceptions of the need for an emergency ambulance may be entirely different from that of a highly specialised A&E practitioner suggesting that practitioners belief of inappropriateness use of ambulance, although arguably correct clinically, does not consider the community needs of the public. Interactions between practitioners and patients contribute to the establishment of long-term relationships, which facilitates effectiveness in primary care (Starfield 1998). Starfield suggests that these long-term relationships are the means by which clinicians learn about many if not most patient's problems and how patients learn about most aspects of their care. Although interactions between patients and practitioners take place in the course of consultation and referral practice Starfield argues that it is the

breath and depth of the context of these consultations etc that distinguishes interactions in primary care from those in other care. This suggests that shifting the emphasis from current ambulance to secondary care transfer of patients to ambulance-primary care could influence the long term usage of ambulance service resources whereby patients would seek primary care help as opposed to secondary care through A&E departments thereby potentially reducing inappropriate ambulance calls.

Studies by Weinerman (1966), Stratmann (1975), Hiker (1978) and Gifford (1980), have found little correlation between what physicians and patients consider an emergency. A more recent study by Foldes (1994) found that when asked 86% of patients believed that immediate medical attention was "very" or "fairly" urgently required. Foldes concluded that there appeared to be no consensus between patient and providers themselves, regarding the definition of an 'emergency'. Even when there is basic agreement among clinicians about the clinical aspects of a patient's problem, opinions diverge in the determination of appropriate treatment setting. Helman (1991) points out that the perceptions of illness held by the public and health professionals are usually very different, particularly with regard to the significance of symptoms. Helman therefore suggests that the general public may well behave in ways that seem inappropriate to health professionals when confronted by illness and injury. Evidence to support this comes from Wood (1986) who found that a common patient perception was that A&E was better and quicker than the GP.

Sanders (2000) study identified a discrepancy between health professional and patient perspectives regarding 'inappropriate' attendances. However, the change in accident and emergency services with the development of minor injury units and nurse practitioners within A and E to treat minor injury patients away from the mainstream A and E service, appears to be based on the professional attitude of what constitutes an appropriate A and E attendance, and not on the patients' perspective. As negative attitude formation towards 'inappropriate' A and E attendances have occurred, there is concern that such attitudes could remain or develop again in the new units. Patients are generally not medically trained and may experience difficulty in ascertaining the severity of their own condition and attending the 'appropriate' service, as defined by trained professionals. This is exacerbated by the unclear boundaries and roles of minor injury units, nurse practitioners and general practitioners in minor injury care.

When considering attendance at A&E departments it was interesting to note that most attendance's at A&E is self-referral i.e. the patient had not contacted their GP before attending the A&E department (Liggins 1992). Fry (1960) in his study into casual attendance in A&E, found that 62% of the patients referred themselves. Conway (1976) showed a reduction in this figure with 37% of the patients in his study using the method of self-referral. Referrals to the A&E department from the place of work or school or from an incident occurring in a public place where someone else has made the decision that patients should attend are similarly high in percentage to the studies undertaken by Morris and Gardner.

There are a growing number of published studies that suggest that the majority of health care is delivered inappropriately with calls for measures of appropriateness to be used by purchasers and others to regulate or influence the delivery of health care (Hicks 1994). Hicks undertook to explore assumptions inherent in results generated by a leading measure of appropriateness and concluded that there are considerable uncertainties about the measures meaning, the magnitude of bias that it contains, and the degree to which its application can be generalised. He believed that some of these uncertainties could be resolved if the tacit assumptions inherent in the generation of the criteria could be made explicit and that existing measures of appropriateness were not sufficiently robust to be used with confidence to influence or control the delivery of health care. However Hicks (1994) believed that measures of appropriateness might have a use as an aid rather than as a constraint in clinical decision-making.

2.3 Inappropriate Location of Care

Calnan (1983) showed that despite the fact that the majority of sufferers with 'minor' cuts and those with 'minor' illnesses saw their complaints as serious and warranting emergency medical attention, the nature of the decision-making in the evaluation of the different signs and symptoms was markedly different. He found that the decision-making carried out by sufferers and significant others in the episodes involving cuts was brief and usually straight forward with the three stages of identification that something is wrong, assessment of significance and decision to act all compressed into the process. Calnan argued that the shortness of this process may have been influenced by the way the signs imposed a 'relevance' on to the sufferer although the visibility and familiarity of the signs enabled the

suffer to make a quick diagnosis and to determine whether more professional help was needed or whether they could deal with the disturbance themselves. Common-sense knowledge also enabled sufferers to distinguish between what was a normal cut and what was one that required medical help. In short, it provided the sufferer and their significant others with the means for assessing what was wrong and how serious it was, as well as providing a recipe for action.

Secondly, Calnan (1983) believed there was some evidence to suggest that patients used the hospital accident and emergency department as a substitute for their GP. This tended to occur particularly when the patients believed the circumstances were inappropriate to contact a general practitioner such as during the night, during the weekend or over a holiday period. Evidence from this study shows that the vast majority of patients with 'minor' conditions saw their conditions as serious and warranting emergency medical attention. It also supports an earlier study by Roth (1971) who concluded that patients are unaware of the non-urgent function of the hospital accident and emergency department and felt able to use such departments only in emergencies. Patients cannot necessarily be blamed for making inappropriate choices. For example Starfield (1998) points out most people do not know enough about the technical details of medical care to make informed judgements about the appropriate source and timing of care for many of their problems and argues that individuals who believe they have a health problem should be able to consult a professional who can help them understand whether the problem is serious enough to require additional care or whether it is a self-limited problem that requires no further care.

A study by Powers (1983) concluded that the catalyst for using the emergency department appeared to be perceived convenience. As Looney (1978) points out, "the American consumer is accustomed to convenience for even non-emergency care and has learned that the local hospital emergency department is usually the only source of round-the-clock medical care". Unless other health services perceived as equally convenient are made available to patients with less urgent health problems, emergency departments will continue to be used inappropriately. Even though professional providers may view minor, short-term health problems as non-urgent, patients experiencing these problems are distressed and feel in need of help. Provider labelling of such visits as inappropriate does little to alleviate a distinct deficiency in health care delivery.

Hensher (1999), however, has argued that most patients admitted to hospital in the United Kingdom have no alternative if they are severely ill and require interventions that are available only through the high technology facilities of acute hospitals. He further argues that most days of hospital care could not be spent in alternative settings because the patient requires facilities that are available only in acute hospitals. In studies looking at the use of acute hospitals, however, a sizeable minority of admissions and, particularly, days of stay are classified as inappropriate. A tiny number of patients may require no care at all and they could immediately return home (Coast 1996). Most patients classed as inappropriate admissions, however, require care over and above that routinely provided, but this could be obtained from a lower technology alternative to the acute hospital (Hensher 1999).

According to Hensher (1999) there are two methods of defining the extent of inappropriate care. The first is to use the judgements of various health professionals. More recent studies, however, have favoured the use of structured utilisation reviews, developed in the United States as a means of cost containment (Smith 1997). Studies of the appropriateness of hospital use can identify the potential for employing alternative forms of care, although extensions to the basic tools are needed to identify what particular alternatives might be appropriate (Coast 1996). However Hensher (1999) argues that such studies cannot show whether it would be better for either the patients or the Health Service if these alternatives were used in practice. He further argues that identification of acute hospitals as inappropriate cannot show that other forms of care are equally effective in terms of patient outcome or that other forms of care are less costly than care in an acute hospital. Only studies that compare directly the relative costs and benefits of alternatives to acute hospitals are able to indicate whether the patient (and the NHS) is better out than in.

2.4 Treat and refer protocols

It has become increasingly clear over recent years that the standard response and treatment offered by the ambulance service is inappropriate for many patients for whom a '999' call is made (Snooks 2000). Many callers do not need the paramedic-staffed lights and siren response, and some are taken unnecessarily to an A&E department (Billittier 1996, Brown 1993). Although the basic premise is for all '999' calls to be taken to an A&E, across England and Wales approximately 17% of patients attended

after a '999' call are not transported to hospital, although the non-conveyance rate is as high as 30% in some ambulance services (Department of Health 1998) mainly due to patients refusing to travel following treatments by paramedics.

In the United States, non-conveyance has been described as the largest litigation risk for emergency medical service providers (Goldberg 1990, Soler 1985). Other than the study by Snooks (2000) no evidence of studies regarding treat and refer protocols for paramedics could be found in the UK, studies have been undertaken in the United States, which although in support of treat and refer conclude that more work is required (Schmidt 2000, Hunt 1999, Riley 2000).

Schmidt identified that from 3% to 11% of patients determined on scene not to need an ambulance had a critical event and that emergency medical systems need to determine an acceptable rate of under-triage. Stronger support for treat and refer protocols was evidenced by Hunt (1999) who concluded that accident and emergency department clinicians agreed that a significant percentage of patients do not require transport. Despite only moderate agreement regarding which patients need transport the under-triage rate was low. No individual criteria showed better than moderate agreement. However Hunt was cautious stating that before implementing alternatives to ambulance transport, more specific criteria must be developed and tested.

Problems with protocol design or its implementation could be a factor. Hauswald 1999) examined whether paramedics can safely decide which patients do not require ambulance transport, who concluded that of 11% of patients triaged to alternative transport were miss-triaged and further concluded that even if protocols were improved patients will still require ambulance transport.

A significant number of patients do not travel to hospital after being attended by paramedics as a result of a '999' call. It could therefore be argued that these patients could be regarded as treat and refer patients. Current arrangements allow for patients to discharge themselves by signing a release form with no reference to any other health care agency, although this procedure would be left to local services to implement and adapt, as they feel necessary. This process can be criticised as being inappropriate due to the implications for more clinically effective and patient focused services. A report

by the Royal College of Surgeons (1997) suggests that the emphasis appears to be gradually shifting away from patients having a right to choose how and where they access the health service towards a system of triage that utilises professional expertise to ensure patients receive the right level of care, in the right place, within an appropriate time frame, and according to their clinical need. However there is a difficulty in that paramedics cannot force patients to attend a clinician should they not wish to do so or to have a GP to attend the patient should the patient refuse. It is feasible that paramedics could be placed in the position of knowing that the patient needs medical care and that by leaving them could compromise their well being. In these situations the paramedic should assess a patient's capacity regarding the ability to make a rational decision about their care, several elements of the individual's character and demeanour are taken into account by the crew: -

- Patients that are temporarily or permanently incapacitated / intoxicated by drugs, medications, and or alcohol.
- Patients that are temporarily or permanently incapacitated by mental illness, confusion, medical condition or learning difficulties.
- Patients with any reduction in their levels of consciousness.

Where an adult has become temporarily incapable then the law permits interventions to be made that are necessary and no more than are reasonably required in the patient's best interests pending recovery. If a medical intervention is thought to be in the patient's best interests, but can be delayed until the patient recovers capacity and can consent to (or refuse) the intervention, it can be delayed until that time. Where a patient is of permanent incapacity, it is lawful to carry out any procedure in the *patient's best interests.* ***([1] NAW Reference Guide to Consent for examination and treatment 2002)***

There is an added danger in patients refusing aid in that a substantial proportion of patients refusing transport do not recall receiving verbal or written instructions. Schmidt (1998) (US) found that of those patients who accessed health care after initially refusing, 6% were hospitalised. Comparable findings found that contact with a medical-control clinician who spoke to the patient via the telephone appeared to markedly improve the transport rate for patients who initially attempted to refuse out of hospital

medical care (Alicandro 1995, Burstein 1998) (US). This was especially so when clinicians were more assertive in recommending transport.

2.5 Effectiveness of Paramedic Interventions

An incrementalist approach to establishing paramedics during the early 1980's focused on a range of performance measures including speed of response, skills activity and numbers of patients treated. Recent emphasis, however, has centred on the clinical effectiveness of paramedics for example in the treatments of myocardial-infarcted patients (heart attacks) (Billittier 1990), diabetics (Yaxley 1991and Wolford 1996), asthmatics (Emerman 1990) and prolonged major trauma (Dalton 1995). The majority of evidence on the effectiveness of pre-hospital care originates in the United States where arguably the use of paramedics and pre-hospital care interventions are more advanced. This is possibly due to the part that medics played during the Korean and Vietnam wars that later transferred their skills to civilian life. Extensive research undertaken in the United States by Bissell (1994) concluded that there is a positive correlation between paramedic interventions and survival for cardiac arrest patients as well as trauma patients. It is these groups of patients, which appear to be the focus for paramedic development with a plethora of research being undertaken with arguments developing as to the efficacy of paramedic interventions in particular circumstances (Powar 1996).

In the U.K. the potential for increased survival rates was realised providing that certain conditions were reversed quickly. Patients, who suffered a cardiac arrest, who were in Ventricular Fibrillation (VF) and were defibrillated early, increased the potential for their survival. This resulted in a government initiative requiring that every front line ambulance in the UK be equipped with a semi-automatic defibrillator with at least one member of staff on each vehicle trained in its use. Central Government provided additional funds as a "one off" with maintenance costs having to be met by ambulance services at the time. Evidence of survival rates is produced annually through national paramedic audits.

Early studies by Pantridge (1967), before the introduction of paramedics, found that a large proportion of patients suffering from myocardial infarction were experiencing delayed admissions for more than twelve hours. To reduce this delay a mobile intensive coronary care unit was introduced to transport these groups of patients direct to Coronary Care

Units. Although staffed by personnel from the cardiac department this initiative is regarded as one of the precursors to advanced training for ambulance personnel.

2.5.1 Additional skills and Treatments

In addition to defibrillation and advanced airway and circulatory skills some Trusts undertake additional interventions such as the administration of aspirin and thrombolytics, which can benefit patients suffering from myocardial infarction. Although literature on the effectiveness of paramedics administering these drugs did not appear in the present literature search the effectiveness of the treatment themselves in pre-hospital care is well established (Moher 1995). According to Maheswaran (1995) performance is better among patients whose treatment begins soon after the onset of pain.

As further evidence of paramedic effectiveness a report issued by the Audit Commission (1995) estimated that approximately 3000 deaths a year among people under 70 could be prevented if everyone reporting a suspected heart attack were reached and treated by a paramedic carrying a defibrillator within 8 minutes of making a 999 emergency call. The report also stated that there is evidence that increased rates of administration of thrombolytics by paramedics could further reduce mortality rates particularly in isolated places. Although there is little evidence that ambulance services are practising these skills there is evidence to suggest that current studies being undertaken, particularly throughout Wales, will support the Audit Commissions recommendation. Approval for the administration of thrombolytics will need to come from the local ambulance services Paramedic Steering Committees who oversee and manage all aspects of training and drug usage.

Additional drugs are being used by ambulance trusts, which arguably add to the effectiveness of pre-hospital care interventions. A report prepared for the Welsh Medical Committee by the Working Party on Asthma (1995) recognising the role of ambulance services stated that

" Ambulance services should be encouraged to provide a first line of support to patients with acute severe asthma. There should be a nebuliser available on each front line ambulance and all emergency calls for asthma should administer nebulised treatment and oxygen " (Welsh Medical Committee 1995)

Studies of asthma undertaken in the United States demonstrate that paramedic treatment of acute asthma with nebulised isotharine is effective in improving pulmonary function and clinical status during transport (Emerman 1990). The study also identified that little work has been done in evaluating the effectiveness of pre-hospital treatment of the acute asthmatic patient. In one study by Ferguson (1995) the effectiveness of nebulised salbutamol administered by paramedics was considered a safe treatment and the study recommended that all ambulances be equipped with this facility. This is now a common practice amongst all ambulance services.

Literature regarding paramedic effectiveness is limited and other than that produced by the national audit of paramedics, which collates data from all UK trusts is normally local to individual trusts. However it could be argued that the effectiveness of interventions used in pre-hospital care are equally amenable to paramedic interventions. The National Association of Health Authorities and Trusts when reporting on epilepsy stated that one of the roles of the General Practitioner is to administer emergency treatment when required (NAHAT 1995) such as that required for diabetics and epileptics. Increasing numbers of ambulance trusts are training ambulance staff in the use of rectal and intravenous diazepam and are fulfilling this role for GP's with their support.

The same can be said for insulin dependent diabetics, who having suffered a hypoglycaemic episode have returned to a stable biochemical state after receiving glucose administered, by a paramedic. Studies regarding the treatments of hypoglycaemia have demonstrated that glucagon or glucose administered by ambulance staff resulted in a significant improvement of the patient's condition (Weston 1990, Yaxley 1991, Steel 1992, Billittier 1998).

Weston (1990) found that of the patients attended *(n=35)* only eleven (31%) ended with admission to a hospital ward. Yaxley (1991) reported similar findings, with three (12%) patients transported to hospital from a total of 25 attended. The largest of the studies, undertaken by Steel (1992), found that of the number attended *(n=103)* 24 (23%) recovered quickly and refused to go to hospital, 62 (60%) were discharged from hospital with no further treatment and of those treated in A&E only 7 (6%) were admitted for further treatments. What is significant is that due to the lack of alternatives patients either remained at home or were transferred to hospital. Patient refusal of transport after

treatment of hypoglycaemia is common in urban EMS systems, although the rate of relapse is unknown. A further study by Wolford (1996) found that of 151 patients attended 99 (66%) were transported to hospital and the majority were discharged with no further treatment.

A study by Socransky (1998) compared the outcomes of diabetic patients initially refusing transport with those transported to an accident and emergency department. Over the seven-month study period, 374 patients made 571 calls to the emergency services that met the inclusion criteria (5.2% of all paramedic runs). Of these, 412 were refusers (72.2%) and 159 were transported patients (27.8%). The hospital records of 4 transported patients were unavailable. Sixty-three transported patients were admitted (11.2%), with 1 death from prolonged hypoglycaemia. The rates of relapse did not differ between the refusers and the transported patients ($p<0.05$). Twenty-five relapses occurred among the refusers (6.1%), with 14 repeat refusals, 11 transports, 5 admissions, and no deaths. There were 7 relapses among the transported patients (4.4%), with 2 refusals, 5 transports, 2 admissions, and no deaths. The paramedic run time was significantly shorter for the refusers than for the transported patients ($p<0.05$). Socransky concluded that the out-of-hospital treatment of hypoglycaemic diabetic patients appears to be effective and efficient and that independent of the patient's refusal or acceptance of transport, the out-of-hospital treatment of hypoglycaemic patients in this system appears to be safe. The high proportion of patients suffering hypoglycaemia-refusing transport is consistent with the studies of Yaxley (1991), Weston (1990) and Steel (1992).

Mechem (1998) concluded that the practice of treating and releasing most hypoglycaemic insulin-dependent diabetic patients who return to normal mental status after treatment on scene by a paramedic appears to be safe. However he advised that patients should be advised of the risks of recurrent hypoglycaemia. A smaller study by Billittier (1998) found similar results amongst 34 patients enrolled. Of the 34, 91% (31) reported no complications after release, although two patients developed recurrent hypoglycaemia but self treated and did not require further emergency care. He recorded that 85% of the participants were very satisfied with not being transported to A&E with 91% very satisfied with the care they received. 100% favoured a permanent protocol allowing for the release of hypoglycaemic patients rather than transfer to an A&E

department. However although Billittier concluded that patients with hypoglycaemia treated by paramedics generally preferred release without transportation he did state that a larger study was required to determine the complication rate compared with that of patients treated in an A&E department.

There are others who dispute whether certain groups of patients benefit from advanced pre-hospital care. In a study of trauma patients *(n=52)* who had received fluid replacement, the volume infused had little influence on patient outcomes due to the short period of time and distance travelled to a hospital (Smith 1985). Smith argued that a percentage of patients with correctable surgical lesions might have been salvaged had prompt transport been instituted. The conclusion reached was that field manoeuvres in critically injured patients should be minimised to decrease ultimate mortality. Similar findings were recorded by Anderson (1987) who found that of patients admitted to a resuscitation room *(n=50)*, only one would have benefited from paramedic care. Rouse (1991), who studied processes of treatment rather than clinical outcomes, concluded that the activities of paramedics are poorly supervised, and that pre-hospital management by paramedics may be jeopardising patient care. However later research undertaken by Bissell (1994) suggests that there is a positive correlation between paramedic interventions and survival for trauma patients with length of journey time and entrapment of the patient in the wreck being of particular importance.

Whilst there is conflicting evidence that questions the effectiveness of paramedic interventions regarding trauma and some cardiac conditions, no evidence could be found to suggest that the treatment of diabetics, asthmatics and convulsive patients by paramedics has detrimental effects on the long-term survival of patients.

The contribution of appropriate skills and emergency responses by paramedics is widely becoming recognised as being of importance to the holistic approach to healthcare. The former Mid Glamorgan Health Authority (1993) who when reporting on Local Strategies for Health on injuries stated that

> *" All patients with a significant injury have the right to a prompt emergency response with trained paramedic staff and fully equipped ambulances "*

Despite the evidence of paramedic effectiveness and in particular aspirin and thrombolytics in pre-hospital care, the Clinical Standards Advisory Group (CSAG) when reporting on urgent and emergency admissions, failed to take the effectiveness of paramedic interventions into account. Although reference was made to the ambulance service, this referred to response times and whether these contributed to a delay in the patient receiving "initial" treatment in the Accident and Emergency department. The CSAG regarded initial treatment as

> *" That undertaken as part of the doctors assessment in the receiving area (A&E dept, admission unit or ward) and before the patient was transferred to another area for definitive treatment. Initial treatment may have been life saving (e.g. Cardio Pulmonary Resuscitation) pain relief or early ' definitive' treatment (e.g. thrombolysis in suspected Myocardial Infarction or administration of nebulisers and steroids for acute asthma."*

Despite the literature regarding effectiveness of paramedics and the development by the Joint Royal Colleges Ambulance Liaison Committee (JRCALC) of clinical guidelines, which enables paramedic protocols to be developed, there appears to be a distinct lack of national clinical standards or desired goals enabling outcomes to be measured against nationally accepted clinical criteria. Although it is a requirement for ambulance services to have in place Paramedic Steering Committees (NHSTD 93), whose role, amongst others, is to set and agree local procedures there is no mandatory requirement to have standards and audit systems in place. Paramedic systems in the United States such as that in Los Angeles County, have established protocols by the Paramedic Training Institute of the Los Angeles County Department of Health Service (Wasserberger 1987). What is evident is that clinicians are the 'regulators' of paramedic programmes and in the establishment of protocols and their involvement in establishing managed care pathways is vital.

2.6 Emergency Medical Dispatch System

A key aspect of effective pre-hospital care is the dispatch of the right resource at the right time for each clinical condition. Since 1998 UK ambulance services have introduced Medical Priority Dispatch Systems (MPDS) into control centres to enable emergency calls to be prioritised. The Medical Priority Dispatch System was developed by Dr. Jeff Clawson in 1977 and implemented in the Salt Lake City Fire Department, Utah (Zachariah 1995). The MPDS protocol is designed to standardise and codify the

operation of Emergency Medical Dispatch (EMD) while optimising safe and effective patient care through dispatch life support and EMS system response. Previously this had been left to the call-takers discretion. The MPDS protocol uses a system of interrogation and time-life symptom determination that enables the EMD to prioritise system response according to user-defined response configurations. Its unique design results in:

- Improved accuracy, efficiency and professionalism of caller interrogation
- "Zero-minute" response time to initiate life saving support
- Improved ease of use and minimisation of potential mistakes through its application of user-friendly graphics
- The elimination of potential EMD bias and errors and omissions through the use of scripted questions and pre-arrival instructions
- The ability to quantify EMD activity through the use of objectively applied review criteria and scripted questions as the "standard".

The information provided through application of MPDS guides the ambulance controller in assigning one of the 248 codes to each 999 call. The code assigned is based on the most significant clinical finding or 'determinant'. Determinants relate to, a sign, symptom, mechanism of injury, or the anatomical location of an injury, and are in essence the answers to the questions the call taker asks. When control staff have confirmed a determinant they dispatch the appropriate response as identified by the relevant protocol (Woollard 2001).

Whilst MPDS codes are grouped by the system into four major categories (A, B, C, D), the UK ambulance response standards currently require that 999 calls are divided into one of two levels of urgency (A&B). It has consequently been identified which of the 248 MPDS codes fall into each UK category. Category A calls are the (potentially) more clinically urgent, and by 2001 UK services were required to reach 75% of these patients within 8 minutes, as measured within each Local Health Group area in Wales with similar arrangements in England.

It is important to remember that telephone categorisation of calls is based on what an untrained member of the public is able to tell control staff (Woollard 2001). Consequently, the MPDS may over-triage a substantial number of 999 calls to category

A (i.e. high priority, time critical). It will therefore, not be unusual for trained paramedics to determine that a lower priority response would have been adequate once they have examined the patient in person (Neely 2000). However control staff are not able to assess the patient in the same way and this does not, therefore, necessarily indicate a failure of the system. Woollard (2001) argues that over-triage is safe because it helps to ensure that patients are never placed into a lower-urgency response category than their clinical condition requires. It is the sensitivity of the MPDS system to high-priority patients, rather than its specificity for low-priority calls, which is of key importance, since it is that which may minimise the risk of under-prioritisation.

Other safety issues that must be addressed in an emergency medical dispatch protocol include questions regarding the presence of scene hazards such as hazardous materials, electrical shock, violence, etc. Thus questioning the caller serves to establish what the appropriate level of response should be to address the patient's medical condition and to provide for the safety of responding rescuers. The MPDS carefully directs the EMD to determine the presence of scene hazards based on the patient's presenting conditions and other indicators to determine the existence of hazards. For example, the MPDS chief complaint card # 15 "electrocution" questions the caller regarding: -

1. Where is s/he (patient) now?
2. Is s/he disconnected from the power?
3. Has the power been turned off?

However, without compliance to the protocol, key information may be missed in the initial caller interrogation. Assuring compliance to the protocol is the only method for ensuring that a complete scene safety assessment is conducted. Without this information, the bystander could take the initiative to begin treating the patient without first assessing the safety of the scene. With the right protocol, training and compliance to the protocol, bystanders can safely be used to provide life-saving support.

2.6 EMD Activity Prioritisation

The ability to safely prioritise EMS responses in communities that have chosen to use the MPDS to more effectively allocate limited resources ensures the availability of these resources for medical conditions that require short response times and the highest levels of clinical capability. Many systems have identified that minor injuries such as cat bites do not require lights and siren ALS response and may be more appropriately managed

by a lower level of system response (Nicholl 1996). In systems with limited resources and non-existent or extended mutual-aid responses, the use of the MPDS ensures that limited resources are optimised.

In addition to the prioritisation of system response, the MPDS prioritises the actions of the dispatcher and bystanders to ensure that life-threatening conditions are identified and responded to immediately. The "first" first responder, individual(s) having the shortest response time, is the caller who is acting on behalf of the patient. The ability of the EMD to provide life-saving instructions to someone, who can provide supportive care, is dependent on the identification that a life-threatening condition (i.e. cardiac arrest, choking, respiratory arrest, or emergency childbirth) exists. The MPDS directs the EMD to first perform an initial assessment, similar to the field provider's primary assessment, through "Case Entry" questions. Case entry questions are designed to determine in the first 20 to 30 seconds of the EMD interrogation whether or not a life-threatening condition exists and where the response is needed. The importance of establishing whether or not the caller is conscious and breathing offers the first opportunity to begin dispatch life support (DLS).

The National Academy of Emergency Medical Dispatch (NAEMD) was formed in 1988 in the United States and assumed the responsibility for controlling and updating the medical content of the MPDS protocols based on evidence via expert input from a fifty-member 'College of Fellows'. It also became the standards-setting and accrediting body for the Emergency Medical Dispatcher course and qualification worldwide.

In the NAEMD position paper "Emergency Medical Dispatching" the association points out that, "pre-arrival instructions are a mandatory function of each EMD in a medical dispatch centre. Such instructions are safe, and in many instances, are a moral necessity". There is a frequently repeated caution that perhaps best illustrates the need to always determine the status of consciousness and breathing. Illustrative of this point is the recent release of a study comparing the MPDS (Derbyshire Ambulance Service) with criteria-based dispatching (CBD) (Essex Ambulance Service) published in 1996 by the Medical Care Research Unit of the University of Sheffield. While not originally designed to study the importance of compliance to the protocol, some of the study findings shed considerable light on the topic of compliance to protocol.

2.7 Chapter summary

The review of the literature has identified that there are certain clinical conditions, which appear to be safely managed by paramedic intervention, although critics cite arguments against the effectiveness of paramedic interventions in trauma cases. The arguments do not appear to be against the role of paramedics or their skill application but more against the appropriateness of the actual intervention. However the introduction of national clinical standards that are based on evidence should enable criteria to be developed that will enable paramedic effectiveness to be evaluated. However what is clear is that transportation to A&E departments currently remains a key role of ambulance services despite general agreement of the overall effectiveness of paramedic interventions.

There is a considerable amount of literature that debates the appropriateness against the inappropriateness of care. It is suggested that the differing views amongst health professionals and others will not solve the problem of the public inappropriately calling for an ambulance as there appears to be a public perception that they can automatically dial '999' and get an ambulance response. Given that evidence suggests that demand will potentially increase ambulance services need to understand this and look to develop ways of managing demand. There is clear evidence that this is beginning to happen with the introduction of Medical Priority Dispatch systems and with studies such as those by Snooks (1998) who proposes 'treat and refer' protocols, which enables triage to be undertaken on scene to determine appropriate location of care.

It is the appropriate location that continues to present the ambulance service with problems in that there are no clear alternatives for A&E departments which suggests that the concept of pre-hospital care pathways that will enable full integration with primary care professionals may be viable. No definitive literature could be found that integrates or considers integrating paramedics with primary care teams utilising fully integrated care pathways for emergency '999' medical conditions.

It is recognised that when considering the introduction of integrated pre-hospital care pathways any development that may change the infrastructure of the organisation or the way that patient care is delivered must be within the context of the ever-changing

priorities within the NHS. The next chapter considers changes within the NHS and whether policy changes have influenced the way that ambulance services deliver patient care and if there are any indications as to whether current efficiency measures such as speed of response are likely to change.

CHAPTER THREE

3. BACKGROUND - HISTORY OF DEVELOPMENT OF AMBULANCE SERVICE AND CHANGES IN NHS

This chapter considers the development of ambulance services within the context of a changing NHS and how these changes can provide a foundation for integrating pre-hospital care more fully with other healthcare providers. The ambulance service arguably now has a new focus due to the shifting emphasis now being placed on quality and the clinical effectiveness of services provided which is underpinned by changing government policies and initiatives.

The main focus for ambulance services currently remains speed of response, with response time still the main indicator against which ambulance performance is measured. The current emphasis on the need to demonstrate clinically effective services together with improved efficiency of resources now allows the ambulance service to consider other aspects of performance in addition to speed of response. Given that proper evaluation of clinical care requires an examination of clinical outcomes (Audit Commission 1998) then ambulance service performance indicators need to change to reflect effectiveness of paramedic interventions.

Since 1996, all ambulance services have had an obligation to ensure that there is at least one paramedic as part of the ambulance crew. Therefore although an ambulance crew consists of a paramedic and an emergency medical technician whose skill level is less than that of a paramedic, it is appropriate to assess paramedic effectiveness as they will ultimately be the one taking the lead for all medical and trauma cases. In addition, should the concept of pre-hospital integrated care pathways be acceptable to a broad range of healthcare professionals then it will be necessary for the ambulance service contribution to patient outcomes to be more formally evaluated and for new measures of performance to be developed.

The focus of this chapter is on both the historical development of the ambulance service and on the changes in the NHS in which these developments have occurred. Particular emphasis is placed on the ways that health service policies, procedures and structures

have changed and the ways in which these changes have facilitated/hindered the development of the ambulance service. This chapter explains the contextual setting for a move toward the introduction of pre-hospital integrated care pathways.

3.1 Ambulance Service History

The history of the Ambulance Service is comparatively short. Prior to the National Health Service Act (1946) ambulance provision was ad-hoc, with counties, towns and villages organising their own facilities. These were very uncoordinated with services provided by either voluntary services such as St John (St Andrews in Scotland) or by the provision of ambulance cover on a part-time basis by those with other jobs such as mechanics, bakers etc.

In some parts of South Wales and Northern England miners paid a penny a week subscription for ambulance cover, which was 'owned' by the mine for the sole purpose of transportation to a hospital or GP facility. The formation of the NHS in 1948 saw all ambulance service provision brought under the control of county councils and surprisingly not the NHS. This was to happen much later when the ambulance service came under the auspices of the NHS during 1974. In the early days skill levels were very basic with only an St John first aid certificate required which enabled staff to undertake very limited skills such as basic Cardio Pulmonary Resuscitation (CPR) and control of haemorrhage. The role of the service was to ensure that free ambulance transport was available to take patients to and from treatment centres with no measures of efficiency or effectiveness considered. Probably the most significant change was in 1966 when the Ministry of Health commissioned a working group, chaired by E.L.M.Millar to report into ambulance training and equipment (Nicholl 2000). The Millar report (1966) arguably became the most influential document ever to be published on the subject of the British ambulance service. It shaped the future direction of the UK ambulance service for the next two decades and beyond and for the first time the task of the ambulance service was clearly defined as:

> *"To transport patients to treatment centres without avoidable deterioration or unnecessary delay. They must have sufficient background knowledge to make certain vital decisions with confidence and act accordingly, particularly in the light of changes in the patients condition, to be able to recognise and report helpfully on various aspects of the case and work generally in accordance with the policy of the accident and emergency services in the locality".*
>
> (Millar 1966)

This report made many recommendations including the introduction of a basic 6-week qualifying course for all staff engaged in accident and emergency duties, which was later to become 12 weeks. An inventory of essential equipment was also introduced in order to establish a minimum standard throughout the UK.

Although the Millar report recommended a minimum standard of training and equipment, additional equipment was often purchased through public donations and localised training. This meant that ambulance services became fragmented in delivering patient care. More affluent areas such as those in the Southeast were able to provide more equipment, whereas other areas such as South Wales made do with basic equipment resulting in inequity of care. This continued with services adopting differing standards of extended care encompassing, intubation, infusion and defibrillation skills, which was not rectified until 1986 when the National Health Service Training Directorate (NHSTD) set the standard for extended training, which all services had to comply with in order to gain recognition of extended skills (Wright 1994).

In 1974 the government commissioned a report from Operational Research Consultancy (ORCON), which analysed and produced emergency response times for three categories, urban, rural and metropolitan. These response times did not take into account severity of clinical condition or injury type. Consequently all 999 calls were treated equally. Although at the time these were not adopted by all services they were significant, as they were to become standard indicators. This was reviewed in 1988 with slight modifications but did not detract from the fact that efficiency was measured by response times, which remained the only measurement of all ambulance services despite the continuing evidence of pre-hospital care successes in terms of the health outcomes to patients.

Response times were to lead to the development of league tables with Health Authorities such as West Country and most notably London investing money to improve on these measures, regardless of the lack of research evaluating either clinical or cost effectiveness. However the measurement of response standards were to change from responding to all conditions equally to a system of prioritisation whereby those with life threatening or those critically ill received priority as covered in Chapter one.

3.1.1 Clinical Skills of Operational Staff

Until recently ambulance staff all had the same training, which involved very limited clinical skills. These Basic Life Support (BLS) trained staff known as Emergency Medical Technicians (EMT's) have slowly been replaced by paramedics with Advanced Life Support (ALS) skills. It is now the norm to have a paramedic and EMT as an ambulance crew. The differences between BLS and ALS are basically paramedics able to give drug therapy, intubate and cannulate patients and to operate a manual defibrillator to give shocks to a 'dying' heart. Although this dual skilled workforce has been the norm for the last 5 years it looks set to change again with the introduction of Practitioners in Emergency Care (PEC's), which are being introduced to optimise the clinical care and safety of patients in the pre-hospital arena (JRCALC 2000). Nicholl (2000) suggests that PEC's represent one response to the heterogeneity of the demands placed upon the emergency ambulance service. The rationale of these PEC's is that they will provide pre-hospital assessment and care for very serious emergencies and to provide assessment, triage, and home care if appropriate for less immediate problems. It could therefore be argued that with the introduction of PEC's and the ever-increasing demands placed on the ambulance service the introduction of pre-hospital integrated care pathways is a much needed alternative to automatic transfer to A&E departments.

3.2 Structural Change in the NHS

There has been a continual debate regarding what constitutes an appropriate level of funding for the National Health Service (NHS). During the 1980's critics of the government continually claimed that the NHS was underfunded, although the problem with the debate was that it was, and arguably still is difficult to put a precise figure on what should be spent (Powell 1997). As the debate continued there was a growing acceptance that funding would never be sufficient to meet all health needs and hence the focus changed to maximising outputs from available resources. This switch from just monitoring expenditure during the late 1990's led to stronger emphasis being placed on the clinical effectiveness of clinical interventions with Health Authorities and NHS Trusts having to demonstrate evidence based practice. Klein (1982) pointed out that this concept of efficiency was not new to the NHS, but during the 1980's increasingly began to dominate government policy with what had been a minor theme becoming a major theme. One objective of increased efficiency was seen as largely attainable by injecting

the NHS with an 'enterprise' culture, consisting of the new managerialism plus a greater emphasis on market orientation (Powell 1997).

Whilst this debate was continuing, market orientation outside the NHS increased. The 1980's saw a large increase in commercial medicine, in terms of private hospitals, beds and health insurance (Griffith 1987). Some of these increases were not seen as a result of a desire for a market system, but were due to governments blurring of the boundaries between state and private medicine (Mohan 1995).

3.2.1 Policy Influences

The White Paper '*Working for Patients*' (Department of Health 1989) represented the most far-reaching reform of the National Health Service in its then forty-year history. The visions of the white paper were that rather than impose centrally determined solutions, managers should be free to react locally to whatever difficulties arose within their district or hospital (Mohar 1995). They would be free to draw on the resources available in the local community to provide a wide range of services.

Despite the opportunities presented in the White Paper the ambulance service standard measurement continued to be speed of response. This was despite the development of paramedic skills, advancements in technology and a general acceptance of the importance of the role of ambulance services in the delivery of health care.

One of the key principles of the White Paper was to ensure that the NHS continued to be available to all, regardless of income and was to be financed mainly from general taxation. The main aims were to extend patient choice, delegate responsibility to where the services were provided and secure the best value for money. The paper's main objectives were, to give patient's better health care and greater choice of the services available and greater satisfaction and rewards for those working in the NHS who successfully adopted the principles of these reforms. These reforms were designed to make the NHS competitive and cost effective and were intended to build on the government's policy of trying to improve the managerial efficiency of the NHS. The crux of the White Paper was to separate the development of the internal market into demand and supply, with providers of services (NHS Trusts), and health authorities and General Practitioners as purchasers. The model for reform followed the Griffiths (1988)

recommendations for community care, which at the time of the reforms had remained unimplemented. The responsibilities of budget holders were to be more clearly identified and encouragement given to search out the cheapest forms of health care provision, public or private (Leathard 1990).

Best (1989) argues that during this period there was little precedent for assessing the quality and reliability of patients' services within the NHS. The need to clearly identify services which represented quality and reliability as well as costs, were lessons, which had to be learnt by looking at how health services were provided abroad and the commercial sector. The creation of the internal market created a plethora of initiatives and techniques aimed at improving quality, many of which challenged traditional assumptions of professional authority (Taylor 1996). Brotherton (1989) argued that any expansion of the internal market was likely to lead to chaos, hardship, more paperwork and loss of consumer choice suggesting that quality or effectiveness of services could be compromised. Brotherton further argued that patients would have to travel further as no district would be able to offer the full range of health services required

Whether the reforms were a success remains part of a broader debate. What is evident is the impact that other influences have had on the reforms. Seedhouse (1995) states that Beveridge's belief that once the backlog of health demand had been met, the NHS would fall into a 'steady state' was invalidated almost from the start. Increasing numbers of older people, new developments in surgery and care techniques as well as rising expectations have all subsequently contributed to the situation of the NHS where demand has always exceeded available resources. In that context Seedhouse argues that waiting lists are one area, which have acted as an important rationing device with severity of clinical condition determining priority of treatments. Akehurst (1993), Philips (1994), Ham (1995) and Williamson (1992) are also of the view that the clinical decision about who to treat, by what means and over what time also constitute an important form of priority setting. All conclude however, that quality or effectiveness of services should be either maintained or increased whilst releasing resources from 'ineffective' services to improve others proven to be more effective.

It was recognised that purchasers faced difficulties in determining how to purchase the most effective care, in managing day-to-day decisions, in dealing with conflicting

demands coming from many sources and with extremely limited information on the outcomes from health care (Akehurst 1993).

During 1998 the government introduced a new set of reforms, which were designed to modernise the NHS. This report ' *The New NHS Modern, Dependable*' kept some of the principles of the recent governments policies such as the shift to primary care but the emphasis was on delivering a more consistent and higher quality of care for patients. An integral part of the programme was *'A First Class Service'* that set out a detailed framework for quality improvement and fair access in the NHS, the main elements of which were:

- clear national standards for services and treatments, through National Service Frameworks and a new National Institute for Clinical Excellence
- local delivery of high quality health care, through clinical governance underpinned by modernised professional self-regulation and extended lifelong learning
- effective monitoring of progress through a new Commission for Health Improvement, a framework for assessing performance in the NHS and a new national survey of patient and user experience

These strengthened the emphasis that there was a need for clinically effective services proven through evidence based practice and placed greater emphasis on the need for research and collaborative planning with other health professionals and interested parties, which was to be funded by a reduction in management costs. 'The New NHS Modern, Dependable' document states that

> *' The family doctor or community nurse is often the first point of call for patients when they need health advice or treatment. Primary care professionals are also the way into the rest of the NHS for most patients'*

Although ambulance services are not specifically referred to in the white paper *'The New NHS Modern, Dependable'* it could be argued that their role needs to change to enable them to play a fuller role in the provision of healthcare. A significantly high number of patients annually access the health care system via the ambulance service through the use of the '999' emergency system with demand increasing from 3 million patient journeys in 1987/88 to 3.8 million during 1997/98 (Audit Commission 1998). It must be noted that the ambulance service responds to all calls and does not operate a system of rationing unlike other healthcare providers where elective workloads can be

suspended due to increases in emergency admissions. This compromises the ambulance services ability to meet response standards, which could arguably show the ambulance service to be failing due to perceived poorer standards. Treatments and clinical management of patients have advanced considerably compared with 10 years ago, with the new white paper offering more opportunities for integrated working through partnerships. The development of integrated pre-hospital care pathways, developed in collaboration with clinicians and other health professionals may provide an alternative to how patients access the health care system appropriately. For this to happen ambulance services will need to demonstrate their clinical effectiveness either as a single provider, or as part of an integrated approach to health care e.g. as part of the Primary Health Care Team. Therefore the need for robust clinical audit systems and effective evidence based research together with innovation must be encouraged to develop the role of paramedics in pre-hospital care.

3.3 Initiatives to Improve and Assess Effectiveness

3.3.1 Clinical Effectiveness

Both '*Working for Patients*' and '*The New NHS Modern, Dependable*' emphasised the need for providers to demonstrate that the services they provide are clinically effective. This arguably gives some direction as to how clinical services should develop as prior to this, policy within the NHS had developed through a process of disjointed incrementalism or by 'muddling through' (Lindblom 1982). It is argued that assumptions behind the creation of the NHS were those of paternalistic rationalism (Klein 1982) suggesting that the development of the NHS is based on knowledge acquired by reason without necessary regard to experience. This is reinforced by Coulter (1992) who makes the point that despite policies and strategies, doctors usually have the upper hand, as the incrementalist approach to policy development through consensus management could not effectively challenge the autonomy of the professional groups. This would suggest potential conflict between managers and clinicians as to providing the best healthcare within economic restraints.

According to Ham (1981) the NHS has been characterised by a clear power structure within which the patient was seen as the passive client. The doctor had the monopoly of relevant knowledge and this asymmetric knowledge meant that the patient, and arguably managers, could not challenge what the doctor said. However, although the consumer view may differ from the clinician view this challenge is largely based on lay rather than clinical

opinion. Conflict is therefore likely to occur when managers press professionals to behave in ways, which the latter do not want (Harrison 1993).

In recent years there have been attempts to shift the balance of power from healthcare providers towards a corporate approach to healthcare, involving clinicians more in the management of resources. Following the Griffiths (1983) recommendations, the new generations of health service managers were charged with two major tasks, to control expenditure and to improve quality by setting performance objectives and to monitor progress towards them. However this did not affect ambulance services whose structures to achieve response standards remained largely intact.

The introduction of a new framework for assessing and managing NHS performance in Wales *'Putting Patients First'* arguably is a way of reducing conflict between clinicians and non clinicians by encouraging all stakeholders to work towards common objectives using principles of clinical governance. The standards for this quality framework are set through National Service Frameworks by the National Institute for Clinical Excellence and allow professional self-regulation. It is hoped that the principles of clinical governance, supported by professional self regulation and lifelong learning, will ensure that research, national standards and guidance are part of the local delivery of services which are sensitive to patients perspectives and needs. The aim of clinical governance is to reduce variations in NHS provision, improve service quality and reduce inappropriate care.

The call for increased professional awareness of likely health outcomes was made in the 'Caring for the Future Document (DoH 1994). Increasing professional awareness was to be made through initiatives such as planning forums, health gain protocols, Department of Health's effectiveness bulletins and post-graduate education. This was to be achieved by:

i) Finding out what services work.

ii) Supporting the most effective services.

iii) Extending best clinical practice across the NHS.

iv) Ensuring advice on effectiveness was acted on throughout the service from 1994.

There was also a call for Health Authorities to spend a higher proportion of their budget on effective services and through contracts: -

i) Develop more appropriate service specifications.

ii) Develop quality standards for most common clinical procedures tied to diagnosis. In addition providers were required to develop clinical audits and share best practice with others. This provided an opportunity for ambulance services to integrate with other healthcare professionals to show how ambulance paramedics contributed to the holistic approach to clinically effective interventions. However there was little evidence at the time to suggest that this was the case (Ellis 1996)

The publication of the government white paper *'Working for Patients'* (HMSO 1989) and implementation of subsequent NHS reforms has led to the development of a great number of initiatives designed to improve the quality of patient care and to make the provision of care more clinically and cost effective. The Clinical Effectiveness Initiative launched in Wales by the Secretary of State in May 1995 was established to build upon and to improve the effectiveness of clinical care and to demonstrate that treatments are up to the best professional standards. The report stressed the importance of evidence and how the evidence must be used to improve quality, although the emphasis was on evaluation and how outcome groups and clinical effectiveness groups would assess achievements.

Waters (1997) argues that many of these initiatives, whilst laudable, have been developed in isolation and often without proper consideration of how they relate to one another or might practically be implemented throughout the NHS. Alongside the major healthcare reforms of the 1990's there has been a steady shift of patient care from traditional hospital based services to community and general practice (Starfield 1998). This has partly been driven by medical advances that have cut the length of stay or enabled patients to be maintained and monitored in the community, rather than in hospital. This is particularly relevant in the field of mental illness and chronic diseases such as asthma, diabetes and some forms of cancer (Felton 1996). The onset of clinical effectiveness has also seen significant developments for ambulance services during this period most notably in coronary heart disease where the paramedic contribution has been explicit in the development of the National Service Framework (NSF) for Coronary Heart Disease both in England and Wales. The skills and contribution of paramedics appears to be steadily growing with ambulance service involvement in a number of pre-hospital care initiatives that are evidence based. There is now a requirement for ambulance services to be a part of a wider clinical audit process with the paramedic intervention playing an important part particularly with regards to the time patients received life saving drug therapy.

Health care professionals are being encouraged to ensure that their practice is based on the best evidence from well-conducted research. Clinical governance in the NHS has given all health organisations, including primary care groups, a statutory duty to seek quality improvements in the health care delivered by their organisation (Rosenberg 1998). Although pressure on limited resources is a factor that clinicians have had to manage for many years, reforms within the NHS, along with a rising demand on healthcare, have increased these pressures to new levels. Wright (2000) argues that more emphasis is now placed on resource management, which has led to more data collection, administration and paperwork, particularly in primary care. In hospitals, short stays, increased outpatient services and a growing elderly population have inevitably put a strain on services. From the supply side, hospitals have reduced their bed numbers, particularly in metropolitan areas. Compounding this has been the shift towards a consultant led service and a limitation on junior doctors hours that has led to severe specialist medical staff shortages in many regions (Felton 1996). Felton suggests that the overall result has been an increase in clinical and non-clinical workload, especially at senior levels, with these strains leading to highly publicised cases of individual patients being denied treatment on the grounds of resource constraints. Doctors became embroiled in the rationing debate, with the government setting broad strategies devolving decision making regarding resource allocation to a local level (Smith 1995). This has led to more doctors seeking a more systematic application of objective evidence to guide them on how scarce resources can be applied most effectively.

Despite the scarcity of resources the critical examination of clinical practice should be an integral part of patient care (McIntyre 1995). This process of evaluating clinical effectiveness includes the development and implementation of guidelines (Thomson 1995), which is a key element of developing care pathways. Although there are those who identify and emphasis the need for this process (Grimshaw 1994, Thomson 1995, Wyatt 1995), few specify how it can be successfully and consistently achieved.

3.3.2 Clinical Audit

Clinical Audit is recognised as a primary mechanism through which research-based guidelines can be introduced into routine practice and patient benefits subsequently measured (Miles 1995). However a study undertaken by Harman (1991) showed that audit was seldom incorporated into routine clinical practice due to clinical professionals feeling

their autonomy was being challenged. In addition, the effectiveness of clinical audit as a means of improving outcomes and quality of care had not been proved. McIntyre (1995) argues that they have tended to be descriptions of performance, which may or may not identify remedial deficiencies. Since 1991 medical audit has become established although research suggests that medical audit is frequently treated as an addition rather than an intrinsic part of medical practice (Kerrison 1993). This was clearly not the case in 2002 when the NHS Plan (DoH 2001) outlined the importance of clinical governance of which clinical audit is a key component. Clinical audit is undoubtedly seen as being an important aspect due to the investment made by the government. Between 1989-1990 and 1993-1994 the NHS Management Executive provided some £218 million, mainly through allocations to the regional health authorities, for the introduction and development of medical/clinical audit within the NHS, with a further £61 million allocated in 1994/95 (NAO 1995).

In order to gain a clearer impression of the progress of clinical audit initiatives, the NHS Management Executive commissioned CASPE (Clinical Accountability Service Planning and Evaluation) to review the organisation and development of audit by doctors and during 1993 found that 83% of consultants and 77% of junior doctors attended most or all of their specialties audit meetings. It was also found that on average 82% of GP's were participating in clinical audit activities.

Of all the ambulance services in the United Kingdom 86% were engaged in collecting data for clinical audit purposes (Ellis 1996). However only 57% employed staff, whose role was clinical supervision with 90% actually using the data to make informed decisions regarding changing practices with other health professionals. What was noticeable was that although 65% had developed clinical standards highlighting the development of ambulance services none had developed outcome measures and were largely process driven.

There would appear to be no distinct difference between medical and clinical audit when talking about audit within the NHS. According to Kogan (1995) doctors saw medical audit, as being a professional method of assessing the effectiveness of their work and of being assessed by their peers with no outside criticism by managers or other medical professionals. All other work carried out by therapists and other health care professionals was seen as clinical audit. Most doctors saw clinical audit as a

method of measuring multi-professional activity with no relationship to outcomes. This view is supported by Teasdale (1992) who writes that medical audit and what constitutes best practice is agreed by doctors and that, although managers have a right to know whether the medical audit is in place and working, should have no right of access to detailed information about the work of individual doctors. Only the general results of the audit processes should be made available to non-medical managers. The policy adopted by the Department of Health in 1991 was to replace medical audit with the wider concept of clinical audit so that it could become a tool that multi-professionals and managers could use when evaluating effectiveness and efficiencies.

Audit is a focus on two distinct areas; managerial and professional. Management audit can be seen to be largely concerned with the use of resources in the provision of healthcare which, according to Bell (1993), appears to have been stimulated by resource management and value for money ideas. Professional audit is concerned with areas, which appertain to standards that are acceptable for professional standards. According to Packwood (1995), when auditing quality standards within contracting, the emphasis appears to be concerned with quantity and waiting lists rather than quality of service. One reason given by Packwood is that purchasers are felt to lack knowledge, although professionals have been noted as informing and educating purchasers about what clinical criteria to include in contracts.

3.3.2.1 Definitions of Audit

There is no consistency with the way therapists within the NHS view clinical audit (Kogan, 1995). Some define clinical audit as a process concerned with measuring professional activity and incorporating attempts to make quality improvements while others view audit solely as a means of measuring professional activity. It could be argued that these merely serve as performance indicators and detract from what clinical audit can really achieve. The framework for the development of multi-professional clinical audit produced by the Welsh Office, states that audit should be seen as an integral part of day-to-day practice with emphasis on outcomes although not ignoring cost-effectiveness and resource allocation.

3.3.2.2 Clinical Audit Stages

An important concept within clinical audit is the dynamics of the audit cycle. Walsh (1995) states that by providing people with a structured approach to follow with practical guidelines, the effectiveness of audit will be much improved. The component parts of clinical audit, according to Kogan (1995) should comprise of six stages.

- Identifying a problem or issue
- Establishing standards or goals
- Assessing or measuring what is happening (auditing performance and function of the organisation) to determine if standards are met
- Identifying the change needed
- Implementing change
- Monitoring its effects

Continuous movement through these stages ensures that quality of care is protected or enhanced. The Welsh Office document (1995) on audit identifies that a prime focus of audit is effective care and that as the process of audit becomes well established, it will be necessary to consider the matter of appropriate care, ensuring that effective forms of care are applied in practice. Appropriate care being defined as: -

> *"The selection from the body of available interventions that have been shown to be efficacious for a disorder, of the intervention that is most likely to produce the outcomes desired by the patient".*
>
> Welsh Office 1995

3.3.3 Clinical Standards

A key component of the clinical audit cycle is the setting of standards. According to Williamson (1993) the word standard within the health service is co-terminous with what consumers or patients perceive, with some perceiving standards higher or lower that others. Whilst this may be true, it can be argued that in the emergency pre-hospital setting, the patient requires help quickly and is unsure of knowing the 'standard' of treatment they require, other than that published in Patient Charter standards. It is not until they have arrived in hospital and are stabilised over a longer period that they become aware of the standard of care that they can expect. This does not detract from the fact that ambulance services can and should have both implicit standards and explicit standards, which can be audited through the clinical audit cycle. Ellis (1996) found that at that time 65% of ambulance trusts used clinical standards with 27%

measuring outcomes. There appeared to be more trusts (49%) who placed greater emphasis on the use of processes with only 41% stating that they had explicit standards in place. Generally ambulance service clinical standards consisted of the following: -

1. The standard identifies what the patient can expect, which is in the form of a quality statement and capable of being measured against.
2. The processes are the procedures carried out by the paramedic while the patient is in their care. These provide an opportunity to measure activities of paramedics through clinical audit such as compliance to protocols, number of interventions by clinical condition and skill application.
3. It is accepted that outcomes are difficult to measure generally, but two measures of outcomes have been developed for pre-hospital care.
   - **i)** Measurement of pain, by asking the patient the degree of pain with no pain being 0 and the most severe pain being 10, an assessment can then be made comparing first and final observations.
   - **ii)** The paramedic as a professional, assesses the degree of outcome, after definitive treatment using a criterion of whether the patients general condition has improved, not changed, or deteriorated.

This information is recorded on a patient clinical record and is used as a basis of information for research. Information obtained from the patient clinical record are outcome measures, such as measures of pain using a rating scale, and assessments of whether the patients condition has improved, not changed or deteriorated, and mortality rates. Caution is urged however as these measures reflect the change in the patients condition from the time the paramedic has attended and treated the patient to the time the patient is delivered at the door of the A&E department. However despite attempts by ambulance services to improve quality of care, particularly outcomes the performance indicators by which services are judged continues to be speed of response. Collaboration with others will be essential if this information is to be used as part of the holistic approach to patient care to enable additional indicators to be developed measuring effectiveness of ambulance services. Since 1999 a considerable amount of work has been undertaken by the Joint Royal Colleges Ambulance Liaison Committee (JRCALC) to produce evidence based guidelines enabling protocols to be developed that ambulance trusts can adopt as evidence of best practice.

3.3.4 Performance Indicators

Since the 1980's both health and social care organisations have received a form of guidance from central government, which has used comparative data in order to compare aspects of performance (Philips 1994). It is recognised that NHS Performance Indicators (PI) do not measure performance as such but can be used as a tool to ask questions and then identify the means to improve performance as a result (Roberts, 1990). The Department of Health produced a set of PI's in 1983 and published 145 PI's as a result of collaborative work within the NHS. The number of PI's has steadily increased over the years with a new set of indicators published in 1989 known as Health Service Indicators. However, the method of analysing statistical and financial data to gauge the relationship between inputs and outputs has not changed. Philips (1994) urges caution when using performance indicators as by definition they are 'indicators' of output and give littler consideration to outcomes. He suggests that performance indicators are founded on inadequate information and recording systems and unless they are subjected to continuous scrutiny both from within and external to the organisation there can be no guarantee of their validity. Whilst this argument may be valid for some statistical and financial indicators it is not the case for clinical indicators, which are designed to improve outcomes. Performance Indicators according to Small (1991) have to be seen alongside the introduction of new management practices and specifically managerial accountability and argues that they were an attempt to introduce more central control of expenditure and more scrutiny of performance following criticism from the House of Commons Committee of Public Accounts (1981). The Committee acknowledged that the DHSS could not control everything but that performance indicators set centrally, could be an effective means of furthering such control as was possible.

There would appear to be arguments for and against the use of performance indicators as a measure of either economic or technical performance. Appleby (1993) urges purchasers and providers to treat indicators with extreme caution as they represent just one aim to meet a given objective at cost, although they have clear uses, they fail to provide any guide as to what is worth doing. A counter argument is given by Coulter (1992) who argues that although outcome indicators have not, as yet, been available as a measuring tool for managers, the barriers against doing so are purely structural and political as well as technical and that by considering Donebedian's model indicators can be developed which encompass efficiency and effectiveness.

The problem with setting performance indicators was that they tended to focus on the process of care rather than on health outcome. They were based on the premise that there were inefficiencies in the health service, which could be identified and ironed out by monitoring and comparing the performance of different sectors and dealing with anomalies (Goldacre 1983). What performance indicators could not do was to question the effectiveness of the treatments and processes within the Health Service.

The Working for Patients (1989) document set about bringing all parts of the NHS up to the level of the best, with improvements in the quality of the service available seen as an essential component. According to Teasdale (1992) the competitive pressures introduced by the internal market included pressures to improve quality; with effectiveness being one of the key elements in this process. This was again a key principle within the '*New NHS Modern, Dependable*', which also sought to achieve greater improvements in quality and efficiency by changing the emphasis from '*counting activity for the sake of it*'.

If existing ambulance service provision is considered, transferring all patients who have requested emergency assistance through the '999' system, regardless of clinical condition, to A&E departments cannot be classified as being efficient, although arguably effective, as everyone receives some medical attention regardless of whether their attendance at A&E is deemed appropriate or inappropriate. There would appear to be limited literature available as to whether this process is clinically effective with the emphasis placed on appropriateness and inappropriateness of attendance rather than the clinical input of ambulance services that makes the attendance inappropriate.

3.4 NHS Direct

It has been recognised that alternatives need to be found that reduce the pressure throughout the NHS and ensure that patients receive the appropriate advice or treatment when required (Audit Commission 1998). A study by the Audit Commission concluded that agencies working in partnership would benefit selected patients and that more patients treated at home would need the co-operation of GP's. This suggests that patients will still refer themselves to a clinician either through the use of the ambulance service, or primary or secondary care through self-referral.

In December 1997, the government created a new 24-hour telephone advice line staffed by nurses with one of its intentions being to reduce the pressure on both GP's and A&E departments (Pencheon 1998). Following the recommendation in the chief medical officers report *Developing Emergency Services in the Community* (Calman 1997) NHS Direct was made available throughout England and Wales by early 2002 with a fully networked system emerging, taking calls from an estimated 20% of the population each year.

Currently, 95% of calls are about symptoms but it is not the function of the telephone consultation to reach a diagnosis. The intention is to recommend further care or referral through a system of triage that reflects the nature and potential urgency of the clinical problem. Typically, 45-50% of all calls are about children and the highest level of use is from mothers of young children. Nurses answering the calls are supported by computer software that can guide questioning, help to weigh information for significance, and suggest optimal disposition according to local circumstances, including self-care at home. There is integral access to corresponding advice and information databases, and electronic links should enable communication with primary care services, hospital accident and emergency departments, the ambulance service, and other agencies.

Despite being seen as a means of reducing 'inappropriate' use of the healthcare system, there are concerns regarding continuity of care and the balance between providing information about health and advice on the most appropriate service to use (Munro 2000). It may arguably be more appropriate for an anonymous service such as NHS Direct to concentrate on providing information rather than advice. Telephone advice and triage are not new as Munro (2000) would argue that primary care professionals do it every day. Intuitively it would seem that advice is more likely to be appropriate if someone who knows a patient's history gave it. The use of telephone nurse triage is established in accident and emergency departments and has been extended to some general practice out of hour's co-operatives, where the problem of anonymity can be reduced by keeping files on frequent callers or patients with complex problems. It may be more appropriate for NHS Direct to focus on providing information about health and illness, encouraging nurse triage to develop through carefully constructed relationships with general practice co-operatives (Florin 1999).

Florin (1999) describes NHS Direct as only one piece of the rapidly developing mosaic of first-point-of-contact health services, which will soon also include walk-in centres in stations and shopping malls. She suggests that the impact of this plethora of health services on need and demand for NHS care is little understood, and there is a danger that these services will foster inefficiency and that developments in easy access primary care should build on the strengths of existing systems rather than cut across them.

NHS Direct received about 68 500 calls from a population of 1.3 million in its first year of operation, of which, 72% were out of hours and 22% about a child aged under 5 years (Munro 2000). In his study Munro found that changes in trends in the use of accident and emergency departments and ambulance services after introduction of NHS Direct were small and non-significant. From an increase of 2.0% a month, before introduction of NHS Direct to – 0.8% afterwards (relative change – 2.9% (95% confidence interval – 4.2% to – 1.5%). Munro felt that this reduction in trend was significant, both for calls handled by telephone advice alone, and for those resulting in direct contact with a doctor. In contrast, the six control co-operatives showed no evidence of change in trend; an increase of 0.8% a month before NHS Direct and 0.9% after (relative change 0.1% (confidence interval -0.9% to 1.1%).

Munro (2000) concluded that in its first year, NHS Direct did not reduce the pressure on NHS immediate care services, although it may have restrained increasing demand on one important part, that of general practitioners out of hours services. It was suggested that this would be the case by others such as Pencheon (1998), Florin (1999) and Snell (1999), in fact Pencheon suggested that increasing access might even lead to increases in demand. The potential to seek and give advice over the telephone, and triage accordingly, has really only been grasped by ambulance services and, more recently, by general practitioner co-operatives (many of whom have coped with increased contracts by reducing the number that are face to face). In North America, health maintenance organisations have long seen the value of a telephone service (highly integrated with good self-care manuals) as part of a convenient and cost-effective primary care service. The directness can work both ways. As well as the potential for NHS Direct to facilitate diagnosis, treatment and administration by providing easier access into the NHS, it also has the potential to look out into the community for example, with better monitoring of frail members of the community (Munro 2000). There are those who do not concur with

Munro such as Aird (2001) and Eaton (2002). Aird believes that the one reason stating that NHS Direct has not had the expected impact is because it needed to be better marketed as it does have the potential to have a significant effect on the increasing demands on primary care. However it is suggested that the increasing availability of alternative services offering first contact care for non-urgent health problems, is likely to have little impact on the demand for A&E services due to patients behaviour (Coleman 2000).

Perhaps of most significance is the view of Watt (2000) who believes that although ambulance services did not seem to be affected by the introduction of NHS Direct there are opportunities in the future for the least urgent (Category C) ambulance calls to be transferred to NHS Direct.

As society changes, the role of a less paternalistic NHS must be to provide opportunities for people to play a greater part in decision-making. Instead of simply requesting, and waiting for a general practice appointment, an outpatient appointment, or being seen in the accident and emergency department, individuals should be able to use NHS Direct for meaningful access to care, where good care often starts with simple advice (Pencheon 1998). This care can range from advice regarding self care to consulting a GP and, if necessary, phone back NHS Direct at a pre arranged time to the immediate sending of an emergency ambulance.

The perennial fear is that increasing access increases demand. This may not be so. Managing demand by cutting supply may by effective for some services, but its hardly ideal in primary care. A better way of managing demand may be to offer a more graduated access to health care, as patients are as aware of the risks and costs of health care as they are of the benefits, with incentives to match. This needs to acknowledge that most healthcare is administered without (or with minimal) professional intervention. The NHS needs to support and improve this by empowering self care, in order to spend its limited resources on services, which it is uniquely placed to provide. (The issue of demand management is considered in more detail in chapter 5)

Broader options for the development of the role of the ambulance service must involve partnership arrangements with many other emergency and immediate care providers,

including primary care services, community trusts and social services (Nicholl 2000). Nicholl argues that helping to define the vision of a broader out-of-hospital health care service must include the integration of the ambulance service with NHS Direct and other out-of-hours call handling.

3.5 Chapter Summary

It seems clear that the way the health service is changing and the continual development of ambulance services provides an opportunity to consider how ambulance services can further progress. Although ambulance service efficiency continues, for the time being, to be measured by speed of response changes in health provision policy are slowly beginning to realise the full potential of paramedic interventions. Increasing demands on the ambulance service and the limited scope that ambulance services have in controlling these demands suggests that pre-hospital integrated care pathways have the potential to provide a means for ensuring both a more clinically and resource effective way of providing health care as opposed to transferring all '999' calls to A&E departments. The introduction of Practitioners in Emergency Care albeit a longer-term initiative, will serve to strengthen and develop further paramedic skills enabling them to broaden their knowledge and skills application and may enable easier integration of paramedics with other health professionals. Whether ambulance services can take on this new challenge without a review of the way current service provision is provided is subject to a wider debate. It is however argued that if integrated care pathways do provide an alternative to existing arrangements then integration with others will depend on a sound quality framework enabling full evaluation of both the organisation and outcomes in addition to speed of response.

Clearly government policy needs to reflect the increased role that paramedics have and how they can contribute to more clinically effective outcomes. Future policies need to consider paramedics along-side other health professionals so that the treatment and management of patients becomes more integrated.

The next chapter considers the concept of integrated care pathways and their role in managing demands and how effective care management can improve clinical outcomes. It also considers the necessary attributes required for the development for the development of pre-hospital integrated care pathways.

CHAPTER FOUR

4. INTEGRATED CARE PATHWAY DEVELOPMENT

Integrated care pathways are structured multidisciplinary care plans which detail essential steps in the care of patients with specific clinical problems. They have, according to Campbell (1998) been proposed as a way of encouraging the translation of national guidelines into local protocols and their subsequent application to clinical practice. They are also a means of improving clinical effectiveness by evaluating what works effectively and also provide a means of identifying the reasons why clinical care falls short of adopted standards (Crombie 1993). Integrated care pathways although used extensively in the United States are continuing to grow in the United Kingdom (VFM 1996) with pathways existing for over 45 conditions or procedures although evidence suggests that these are used far more in surgical services where care is more predictable where set routines of practices were already in place.

There does however appear to some confusion regarding the terminology of integrated care pathways. The NHS Modernisation Agency (2002) uses the definition of protocol based care stating that 'these are steps taken to deliver care or treatment to a patient and are sometimes called integrated care pathways'. Although the term protocol based care is arguably better suited to the ambulance service the term integrated care pathways has be used throughout this thesis.

The development of pre-hospital integrated care pathways draws on three main concepts which have key features of recent changes to how health care is delivered; managed care, clinical guidelines and integrated care pathways.

4.1 Managed care

Starfield (1998) describes managed care as an attempt to control costs and the provision of services by the means of an array of externally imposed incentives and disincentives designed to alter the utilisation of services. The rapid growth of managed care in the United States has had many implications for patients, doctors, employers, state and federal programmes, the health insurance industry, major medical institutions, medical research, and vulnerable patient populations. Fairfield (1997) argues that it has restricted patients' choice of doctors and limited access to specialists, reduced the

professional autonomy and earnings of doctors, and shifted power from the non-profit to the for-profit sectors and from hospitals and doctors to private corporations. It has also raised issues about the future structuring and financing of medical education, research and about practice ethics. However, managed care has also accorded greater prominence to the assessment of patient satisfaction, profiling and monitoring of doctors' work, the use of clinical guidelines and quality assurance procedures and indicated the potential to improve the integration and outcome of care.

Managed care in the United States has grown because it allows employers and public health programmes to purchase services for its clients at lower cost than traditional insurance (Fairfield 1997). The growth of a competitive market and increased purchasing expertise has allowed private and public purchasers to contain the growth in premium costs and in some instances to reduce them (Zelman 1996). Healthcare organisations that use managed care are able to reduce costs by negotiating aggressively with hospitals and provider groups on rates and use of expensive resources such as inpatient care. Several sources report decreased utilisation of health services and decreased lengths of inpatient stays by managed care organisations (Starr 1982, Inglehart 1993, and Zelman 1996). There is concern that this may reduce the demand for hospital beds and decrease hospital revenues, with the result that hospitals downsize and even close (Fairfield 1997). Similarly, according to Fairfield, organised managed care networks need fewer specialists; by using primary care gatekeepers (who may have financial incentives to manage patients themselves) they shift power from specialists to general practitioners. As hospital and outpatient clinics are required to function more efficiently and at less cost, it remains unclear who will reimburse the higher costs of medical and other professional training, research, and patient care associated with new experimental treatments that do not fall within the managed care definition of "necessary care." (Fairfield 1997)

There are implications for clinicians with Fairfield (1997) suggesting that doctors may experience decreased autonomy or lack of clinical freedom. Alternatively, they may derive satisfaction from working with guidelines within evidence based medicine and enjoy increased professionalism from knowing that their practices are operating to high standards. Despite the possibility of issues such as reduced status, reduced clinical freedom and increased supervision Inglehart (1994) points out that by participating in

managed care, doctors are actually showing a willingness to adapt to situations in which their actions may be curtailed and their accountability increased. However, this willingness may be a result of the fact that work within managed care may be preferable to no work at all (Fairfield 1997). Doctors are required to work in a more multidisciplinary manner and relinquish some control with many procedures being removed from doctors and placed in the hands of other professionals, such as psychologists and optometrists, who have become preferred providers (Fairfield 1997). It is suggested by Fairfield (1997) that although this demands a culture change there are many opportunities for collaboration with doctors often pulled between competing loyalties and a tendency to resist cost control measures because they suspect the motives of the managers.

If clinicians in the United States perceive managed care negatively, initiatives in the UK may engender similar fears. How managed care is presented to, and seeks to engage, clinicians in the UK will be central to its success. A report prepared for the Department of Health undertook a systematic review of the US experience of managed care and an analysis of what lessons, if any, the UK can learn painted an extraordinary picture of the US situation (Le Grand 1998). The report found that managed care institutions such as Health Maintenance Organisations or Preferred Provider Plans covered half of the insured population, and even conventional fees for service insurance systems increasingly using managed care techniques. The report further found that clinicians were subject to prospective utilisation reviews and pre-authorisation requirements; concurrent reviews as treatment proceeds; retrospective reviews once treatment has been completed; and sometimes even mandatory second opinions. They have to follow clinical guidelines and their performance is continuously monitored and compared with that of their peers.

Le Grand (1998) argues that most of the studies of managed care have concentrated on an issue of great concern to the US but are of less interest to the UK: the ability of managed care systems to hold down costs while maintaining quality, as compared with fee for service systems. Le Grand suggests that since the NHS is already rather successful at holding down costs, and since many US managed care organisations are moving towards NHS systems of cost control, such as capitation payment systems and primary care gatekeeping, there is little for the UK to learn. Others such as Robinson

(1998) do believe there are things to be learnt from US experience about specific techniques of utilisation control. Robinson argues that one general lesson is that the more tightly organised a managed care organisation, the greater the impact on performance with higher screening rates, more cost consciousness, and improved (or at least maintained) quality of care. In such organisations doctors also had more consistent practice styles, including legibility of records, use of diagnostic procedures, and in the process of care. This has obvious implications for primary care groups both for their organisational structure and, given that tightness of organisation is generally easier for smaller groups, for their optimal size. Another lesson concerns the availability of treatment choice: managed care organisations were most successful in encouraging cost consciousness when clinicians felt that they had medically reasonable options.

The biggest challenge to hospital clinical autonomy comes not from primary care groups but from central government (Le Grand 1998). Le Grand suggests that the two central bodies proposed in the white paper are likely to have a direct impact on clinicians' choice of treatment, with the National Institute for Clinical Effectiveness formulating clinical guidelines, and the Commission for Health Improvement enforcing them.

4.2 Clinical Guidelines

One of the powerful mechanisms underpinning managed care is the use of guidelines; either to pre-authorise care, manage ongoing treatment and length of stay, or for managing complex, high cost cases. Though often written and approved by doctors, these guidelines are usually administered by managers or nurses, curtailing some of doctors' freedoms although doctors retain ultimate responsibility for patient care. The implications for doctors depend on the quality of the guidelines and how and by whom they are applied.

The development of pathways appear to be dependent on effective guidelines developed by a multi disciplinary team involved in patient care that facilitate the introduction of multidisciplinary guidelines into routine practice. Practice guidelines are considered valid if 'when followed, they lead to the health gain and costs predicted for them', therefore, valid guidelines, when appropriately disseminated and implemented, can lead to changes in clinical practice and improvements in patient outcome (Grimshaw 1993).

Guidelines are more likely to be valid if they are developed using systematic reviews, national or regional guideline development groups which consist of multi disciplinary teams using explicit links between recommendations and scientific evidence (Grimshaw 1995). During the mid 1990's there appeared to be a sudden interest in guidelines with opinions differing amongst clinicians and managers with some believing that clinical freedom would be constrained (Thomson 1995). However in 1993 the Department of Health introduced an initiative called "*Improving Clinical Effectiveness*" to encourage the adoption of evidence based guidelines within purchaser-provider contracts, which was widely accepted. Perhaps the clearest definition of a guideline is that from the Institute of Medicine, guidelines being "systemically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances". Guidelines also have a role in supporting quality assurance and audit, including providing the framework against which care can be evaluated. Guidelines can:

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- Help patients and professionals to make decisions about health care
- Describe appropriate care based on the scientific evidence and broad consensus, leaving room for justifiable variations in practice
- Focus on specific circumstances while taking into account organisational factors, community characteristics, and other influences on health care delivery
- Act as a focus for quality assessment and improvement activity, including audit.

According to Thomson (1995) the reasons for the prominence of guidelines should be considered when developing pathways. These include an emphasis on audit and on improving the quality of healthcare; medical advances and increasingly complex clinical decision making; unexplained variations in clinical practice; heightened public awareness of, and participation in decision-making; and a more explicit debate about the use of limited resources. What this does is to raise the use of care pathways from a pure clinical tool to one that encompasses all aspects of clinical and operational management.

4.3 Integrated care pathways

An integrated care pathway is a means of managing care where health-care professionals, and where appropriate, patients and their families' come together to

determine how care will be delivered. This approach gives rise to a shared care plan designed to ensure continuity across a range of disciplines (Morris 1995). As the pressure to lower costs and improve the clinical effectiveness of clinical interventions increases, providers search for tools to reduce resource consumption and provide better outcomes for patients. As a result, the use of care pathways is becoming more common in health care organisations both in primary and secondary care. In the UK, managed care is beginning to be recognised as a cost effective, quality driven system which can be used to structure patient care (Jones 1997) mapping the most cost-effective practice for a particular procedure or patient population whilst improving patient outcomes and reducing costs (Schriefer 1994). In addition they provide a number of benefits, which are oriented towards ensuring patient focused care thereby improving clinical outcomes. Patients who fail to progress as expected are identified early in the stage allowing early and appropriate intervention with co-ordination between disciplines preventing duplication of clinical care (Schriefer 1994). In addition integrated care pathways can also be used to provide seamless care during transfer of the patient from the hospital to care in the community.

Pathway management is referred to by several names; integrated care pathways, critical care pathways, managed care pathways; multidisciplinary care pathways or care maps. All have the same objective, which is to improve outcomes whilst reducing costs by reducing unnecessary documentation and overlap. The simplification of documentation for a stay in hospital, from pre-admission assessment to the co-ordination of discharge planning, often results in a more consistent length of stay with the patient flow through the hospital predicted with potential problems being resolved in advance. Care pathways are defined by Crummer (1993) as being a "systematic approach to identifying high cost patients, assessing potential opportunities to co-ordinate their care, developing treatment plans and improve quality and control costs, and managing patients total care to ensure optimal outcomes". Integrated care pathways define the expected course of events in the care of a patient with a particular condition, within a set timescale, divided into time intervals during which specific goals and expected progress are defined, together with appropriate investigations and treatments. The activities of all members of the multidisciplinary team are reflected in the pathway with variations from the pathway documented, and the causes analysed with avoidable variation prevented or corrected.

Integrated care pathways use multi disciplinary guidelines or in the case of paramedic's protocols, to develop and implement clinical plans, which represents current, local best practice for specific conditions. They may also incorporate national guidelines, evidence-based medicine and benchmarking (Rosenberg 1995).

In addition integrated care pathways provide a powerful audit tool, as all aspects of patient care are constantly monitored and variations from set standards are minimised. Clinical outcomes and the quality of patient care can be improved by this reduction in variation of clinical practice (Kitchiner 1996). The critical examination of clinical practice is seen by Kitchiner (1996) as being an integral part of patient care, which should include the development and implementation of guidelines, together with continuous evaluation of clinical process and outcomes to improve the quality of care provided.

The use of integrated care pathways facilitates the introduction of guidelines and protocols and the continuous evaluation of clinical practice where clinical audit has arguably failed in achieving this.

The methodology and objectives of integrated care pathways are consistent with those of total quality management and continuous quality improvement. They are essentially the application of these principles to the patient's bedside (Cheah 1998). Although quality in the context of effective healthcare can be a confusing concept the most widely known framework for assessing quality in health services is Donebedian's model of structure, process and outcome (Powell 1997). Structure refers to the physical and organisational setting and available resources for providing health care. Process involves what is done to the patient in terms of advice, diagnosis, treatment and after-care. Outcome relates to the change in the health of the patient. It has been stated earlier that ambulance services are currently organised mainly to meet response standards. But it is suggested that Donabedians model can be developed to underpin integrated care pathways that encompass pre-hospital care thereby enabling ambulance services to better assess the quality of services and care these provide.

4.4 Relevance to Research

The notion of care pathways is not new to health care, (Crummer 1993). They date back to the Second World War. Then the term described assembling the extended community services necessary to care for discharged psychiatric patients (Giuliano 1991). By the 1960's the United States was using the term to characterise programmes designed to overcome the barriers of fragmented, duplicated and uncoordinated services with literature showing that the real progression of critical paths was during the mid 1980's.

The New England Medical Centre Hospitals are considered the pioneers of centering case management for nurses 'borrowing' the concept from engineering project management (Lumsdon 1993). Its introduction was designed to achieve clinical and economic outcomes within Diagnostic Related Groups (DRG's) allocated lengths of stay with five common goals: -

- outcomes which fulfil the standard case management plan or a well-negotiated alternative set of expectations
- well co-ordinated continuity of care through collaborative practice patterns
- proper use of resources and to reduce wasted time, energy and material
- timely discharge within DRG length of stays or earlier
- professional development and satisfaction

These principles might apply equally to the development of integrated care pathways that originate from a '999' emergency call attended by paramedics.

Pathway Management attempts to answer four core questions: -

- what is required by each discipline to bring patients with similar diagnosis to realistic outcomes?
- what is the best way to produce that work?
- who is accountable for those outcomes?
- how can care be restructured so that this happens consistently?

It is believed that by asking these questions when designing pre-hospital integrated care pathways closer integration between ambulance services and other health disciplines can be achieved. The development of care pathways has been strongly influenced by Total Quality Management (TQM) principles and patient centred care, though their use

has more or less coincided with those management philosophies rather than grown out of them (Lumsdon 1993). Given that integrated care pathways specify and evaluate clinical practice and can improve patient care in a co-ordinated and timely manner their relevance to pre-hospital care is arguably appropriate as paramedics adhere to protocols agreed with clinicians and work within a quality cultured environment.

What is clear is that the use of care pathways is growing. In the UK two national groups had been established: the National Pathways Association (NPA) covering England, Wales and Ireland and the Scottish Pathway User Group (SPUG) in addition there are five regional groups who do not belong to either the NPA or the SPUG. Integrated care pathways appear to be developing with the development and collaboration between professionals and disciplines within the health service. A report commissioned by the Clinical Resource Utilisation Group (CRUG) "*An Introduction to Clinical Pathways*" (Sept 1999) included ambulance paramedics when describing the development of a pathway to manage patients presenting with chest pain signifying the increasing role that paramedics are undertaking. The CRUG report considers the development of care pathways and why tasks and interventions are performed, and more importantly from an ambulance service perspective by whom. This promotes greater awareness of the role of each professional involved in the care cycle. The report concluded that teams that worked together were surprised at how little they knew of each others input into an individual case type or category of care. The report also recognised the less predictable nature of primary and community care together with the more complex arrangements for service delivery may at first appear to preclude the development of care pathways. However the report suggested that a pathway can be designed for all conditions regardless of diagnosis or setting.

Most of the literature found focused on the financial evaluation of care pathways implemented in the United States. The delivery of nursing care in the early 1990's was believed by Cohen (1991) to be inadequate in dealing with the many constraints and economic uncertainties that existed in healthcare settings due to traditional models of providing care. He concluded that nursing must be able to realistically determine the cost of and evaluate the effectiveness of nursing care provided to patients and that by adopting nursing case management through the introduction of care pathways would

allow nursing services to distribute hospitalised patient care effectively and influence both its costs and quality.

4.5 Benefits of Care Pathways

According to Kitchiner (1996) integrated care pathways provide a number of benefits, which are orientated towards ensuring patient focused care.

- their use reduces errors and ineffective practice thereby improving clinical outcomes
- pathways identify patients who fail to progress as expected, allowing early and appropriate intervention
- co-ordination between disciplines prevents duplication of clinical care
- help patients and professionals to make decisions about health care
- describe appropriate care based on the scientific evidence and broad consensus, leaving room for justifiable variations in practice
- focus on specific circumstances while taking into account organisational factors, community characteristics, and other influences on health care delivery
- acts as a focus for quality assessment and improvement activity, including audit.

Integrated care pathways allow team members to learn appropriate care for individual conditions. They provide a means of updating knowledge and enhancing educational opportunities for paramedics and other clinical professionals. Kitchiner (1996) argues that the team approach to developing and using pathways encourages communication and in reducing documentation.

4.6 Managing Demand

Integrated care pathways are based on what actually happens when care is provided to the chosen group of patients rather than on what it is believed should happen as the process of pathways considers why tasks are performed and by whom. This promotes greater awareness of the role of each professional involved in the care cycle and reduces duplication of tasks and to some extent prohibits professional autonomy. This enables the evaluation of current practices and asks questions about the appropriateness of particular investigations or treatments. Elements within the processes of care pathways can be tested against the available evidence, providing a logical framework for the incorporation of clinical effectiveness into routine practice. Although care pathways cannot reduce the overall demand on the health service, current trends suggest that

integrated care pathways will continue to develop and be extended into primary and community care settings (Campbell 1998) and can present an alternative to ensuring that demand is met more appropriately. It is feasible therefore that integrated care pathways can reduce demand on the A&E departments although potentially increasing demand on primary and community professionals. Perhaps of more significance are the benefits to the ambulance service whereby resources can be released to deal with other more life threatening emergency calls.

Rogers (1998) argues that people currently deal with many, if not most, health problems without consulting the health service. Relatively small decreases in these self care behaviours or increases in the accessibility of services could produce large changes in demand for formal care with the belief that the health service should promote self-care and improve the way it responds to peoples illnesses (Rogers 1998). Needs can then potentially be met more efficiently in appropriate and acceptable ways. The challenges of meeting the demand for public services that are free at the point of use are increasing (Pencheon 1998). Pencheon argues that increases in demand can normally be managed either by reducing the demand or increasing the supply but in health care the opposite of both these approaches is the reality. Demand is fuelled as it is not managed, by not curbing expectations, and often supply is cut through lack of resources.

Demand management is the process of identifying where, how, why, and by whom demand for health care is made and then deciding on the best methods of managing this demand, so that the most cost effective, appropriate, and equitable health care system can be developed. It is concerned with making more appropriate use of the health services not necessarily reducing it or making it cheaper (Pencheon 1998). More specifically as quoted by Vickery (1995) *" demand management is the support of individuals so that they may make rational health and medical decisions based on consideration of benefits and risks"* this suggests that clinicians currently do not have the autonomy that many believe they have, given that there is criticism that demand is not currently being managed. The many causes of a demand for health care need a variety of responses, where pressures may be best met, not by curtailing demand but by coping with it and meeting it in a radically different way, such as care pathways and help lines offering advice. The effective management of demand requires both secondary and primary care to work together with the ambulance service.

General practitioners have acted as official gatekeepers to the UK hospital service since the inception of the NHS in 1948. They are arguably the most important mechanism for managing demand in the NHS (Coulter 1998) although increasing patient expectations are placing strains on general medical services (Gillam 1998). While empirical evidence for increasing demand is difficult to establish, the population's use of primary care services has changed and will continue to change in response to demographic and technological pressures. However Rogers (1998) argues that although internationally the low cost of primary care in the UK is envied, the present configuration of services is not necessarily the most effective or appropriate way of meeting needs. Out of hours visits by GP's are a particular point of tension where people are increasingly being told they must not call the doctor 'inappropriately' and are perhaps being made to feel guilty about the use of such services. At the same time doctors are seeking ways of reducing their commitment to providing out of hours care as a way of reducing their overall workload. The growing number of GP co-operatives that now exist throughout the UK evidences this. An independent review in GP 0ut-of-Hours Services in England reported that there should be reassurance and peace of mind that expert medical care is available outside of normal surgery hours and that the closer integration between initiatives such as NHS Direct and GP out-of-hours services means that patients should have the confidence that their calls will be handled consistently and professionally wherever they live. Although this appears to have resolved the problem of doctors trying to reduce their commitment out of hours whilst maintaining some provision of care the problem of managing demand still exists for ambulance services. Regardless of demand ambulance services are still expected to respond to '999' emergencies and cannot refuse. Unlike acute units who can cancel elective surgery or can close wards ambulance services still have an expectation placed on them that they will respond within response standards. It is recognised that the introduction of pre-hospital integrated care pathways may increase pressure on GP's but also have the potential of freeing ambulances quicker at the point of patient contact.

Despite this attempt to reduce workloads the UK referral system undoubtedly contributes to the low cost of health care relative to other countries (Coulter 1998). At its best the referral system ensures that most care is contained within general practice, and when specialist care is needed patients are directed to the most appropriate

specialist. However it could be argued that it is also a restrictive practice, initially introduced to protect the interests of doctors, which gives general practitioners a monopoly over primary medical care and restricts patient's freedom of choice (Coulter 1998). Clinical professionals are likely to continue to be in a powerful position to shape need and demand for health care and therefore access, although as Armstrong (1990) believes a barrier to this could be that traditional models of professional behaviour do not always promote high quality user led access to a complex system of health care. Armstrong further suggests that professional changes, which would enhance access to care, include a consistent and seamless approach to advice, a multi-skilled workforce, and a culture in which interprofessional rivalry is minimised and where real communications happen. There are those such as Webb (1998) and Andrulis (1998) who believe that Health authorities and primary care groups need to target health services and improve access in areas with high deprivation and high mortality rates as socio-economically disadvantaged groups not only have greater needs but also have less access to help.

Attempts to modify referral behaviour have usually relied on the development of clinical guidelines to assist decision-making about when a referral is appropriate. Good evidence exists that guidelines can help change clinical behaviour, but they are likely to have an impact on practice only if they are agreed by those responsible for implementing them (NHS Centre for Reviews and Dissemination 1994). Therefore the involvement of all clinicians together with the ambulance service on the construction and agreement of clinical guidelines is fundamental in the development of pre-hospital integrated care pathways.

4.7 Chapter Summary

Despite the implications that integrated care pathways may have for clinicians in that they may inhibit professional autonomy their growth and popularity is evident. What are clear are the opportunities for ambulance services in that they allow the translation of national guidelines into local protocols and their subsequent application to clinical practice as described by Campbell (1998). As previously stated the ambulance paramedic follows protocols and the development of integrated care pathways provide the opportunity for ambulance services to become a key player in providing more effective care through protocol development that meets the requirement of integrated

care. The introduction of integrated care pathways would enable ambulance services to introduce protocols based on care enabling the concepts of quality management to be considered. As pathways require continual audits to be undertaken to identify what is effective and that what is ineffective the potential exists for ambulance services to consider outcomes, both clinical and non-clinical as an addition to measuring speed of response. Whilst is not suggested that the development of pre-hospital integrated care pathways can reduce demand on the ambulance service they have the potential to divert patients to the most appropriate mediums for care and can reduce 'inappropriate' attendances at accident and emergency departments. In addition it may be possible to free emergency ambulance crews to deal with more pressing emergencies or to release them to be available for other emergency calls.

Clinicians influence and manage the clinical developments of paramedics and it is these clinicians who develop protocols whether it be through JRCALC or through Paramedic Steering Committees. It is therefore considered vital that their views are sought on any changes to existing practices. Pre-hospital integrated care pathways clearly involve significant changes to these existing practices and without clinical support cannot easily be considered. The next chapter seeks to determine the level of clinical acceptance to the hypothesis through a range of study techniques.

CHAPTER FIVE

5. METHODOLOGY

The aim of this research is to consider whether pre-hospital care pathways can improve the clinical effectiveness of emergency managed care. It does this by 1) identifying clinical conditions that are suitable for the development of pathways, 2) producing a suggested protocol for one of the identified clinical conditions as an example and 3) developing a set of review criteria capable of assessing performance of the new system. This chapter describes the methods used in the pursuit of these aims.

The current situation within the UK ambulance service is to automatically transfer all patients to A&E departments with performance measured solely by response times. The literature review suggested that it is desirable to move from the current position to one where the increased skills and responsibilities of paramedics are utilised more fully ensuring patients receive the most appropriate treatment at the most appropriate place. It also suggested that the contribution of ambulance crews to clinical outcomes is becoming increasingly recognised and hence reliance on performance measure in terms of response time is no longer appropriate.

This thesis explores how the use of appropriate pre-hospital integrated care protocols can improve the current situation with respect to the above two observations. First, by allowing the ambulance crew to determine on-scene the most appropriate treatment path for the patient, pathways introduce a logical alternative to the much-criticised current system of automatic transfer to A&E. Second, development of an appropriate set of review criteria for the pathways can allow the contribution of the ambulance service to patient outcomes to be assessed, thus moving away from the much criticised current system of measuring performance solely in terms of response times. However it is recognised that this improved protocol would need to be a part of an agreed integrated care pathway.

Currently, there are two sets of protocols, which are used by the ambulance service.

- *Dispatch protocols* are used by those taking the 999 calls at the ambulance control centres, which are detached from ambulance bases. These include what information to give over the phone to help the caller deal with situation until the ambulance crew

arrives and includes pre-arrival advice regarding how to resuscitate and control haemorrhage and how to deal with obstetric emergencies such as birth delivery.

- *On-scene treatment protocols* are used by the ambulance crew to determine what treatment to provide. As noted in chapter 4, treatment protocols are considerably more rigid than guidelines used by doctors, allowing far less judgement on the part of the paramedic. It should be stressed that the introduction of pre-hospital integrated care pathways will affect only what happens after on-scene treatment is given i.e. they will use existing dispatch protocols and on-scene treatment protocols. However, as explained earlier, the introduction and assessment of pathways has to take account of structures and processes as well as outcomes. Thus pathways are seen as encompassing more than just the point at which the decision on where to take the patient following on-scene treatment is made. The review criteria, which will assess whether the pathways are improving performance, may identify where either set of protocols might require review and alteration. Accordingly, the existing protocols are included within the pathways.

This chapter describes the methods used to achieve the above in a logical sequence, which does not necessarily reflect what happened chronologically. For example, it was decided that it would be simpler to undertake phases 1 and 2 of the workshop at the same one and a half day meeting, even though proceeding with phase 2 was conditional on the results of a survey (described below) indicating support from a bigger and broader sample of health professionals. Had the survey shown that such support was not indicated, then the project would have been abandoned and the time spent on phase 2 wasted.

5.1 Finding an appropriate method

Relationships between ambulance personnel and clinicians are generally very good with positive support for most initiatives progressed by ambulance services. However, initiatives involving changing practices, new skills or techniques have historically been led by clinicians. To progress with the study, a method of involving a range of clinicians would be required.

Consideration was given to developing a questionnaire, which could be sent to a large sample to elicit opinions with regard to the development of pre-hospital care pathways.

This method was rejected on the basis that there was potential confusion regarding what specifically was meant by 'clinical pathways'. The use of a questionnaire would thus require a lengthy description but would still be subject to possible misunderstanding, which would raise serious concerns over validity. Additionally, without clinical input from a small group, it would be difficult to know what needed to be asked and in what context. Therefore a workshop was chosen as the best method for beginning the process.

A convenience sample of health professionals and lay representatives were invited to participate in the workshop. It was accepted that this sample, particularly the clinicians, would not necessarily be representative, nor was this the intention. Those clinicians invited were known to have an open mind in pre-hospital care and it was felt that should they not support the principle of pre-hospital care pathways then further development of the study would be questionable. In addition to clinical professionals, community health council members were invited to attend together with commissioning authorities and ambulance personnel. The rationale for inviting non-clinical professionals was to ensure that the workshop considered factors necessary for the development of pre-hospital care pathways that would potentially be acceptable to patients. The involvement of lay representatives was considered important at this stage due to the fact that although clinical care pathways could potentially be developed, the expectations of patients meant that this development might have been inappropriate at this time. Patient's views however were not extended beyond the workshop stage and do not form any other part of this research.

Despite the deliberate selection of clinicians known to be sympathetic to the objectives of the workshop, it was anticipated that concerns might still be raised by some clinicians that potential developments could impinge on their professional autonomy. There was also concern that any change to current practices, even if proven to be clinically effective and safe, could potentially result in disinvestment of existing resources from secondary care to primary care. This was anticipated given the political emphasis on the shift of resources to primary care and the potential for perceived increases in GP workloads. Evidence had to be borne in mind, which showed that although some GP's were enthusiastic about recent reforms because they increased the prominence of general practice in local health policy, others were feeling demoralised and disheartened

(Exworthy 1996). Therefore motivating clinicians to accept a potential change in direction in the way care was managed by the ambulance service whilst ensuring that clinical autonomy was maintained was considered as being fundamental to the study.

5.2 Pre-workshop considerations.

Bringing together clinical professionals requires funding to ensure that locum cover can be arranged, accommodation costs can be met and refreshments provided. At the time there were opportunities for small grants through the Healthy Valleys initiative of the Value for Money Unit (VFM), Welsh Office. It was suggested by the VFM that the case for funding would be stronger if the workshop proposal was developed within the Clinical Effectiveness Initiative.

The principles of the Clinical Effectiveness Initiative (CEI) were considered and it was felt these broadly reflected the aims of the proposed workshop and would provide a framework within which clinicians might find it acceptable to work. The main principles of the CEI is to develop effective partnerships and through collaborative working reduce potential tensions whilst identifying the means of achieving good clinical outcomes through evidence based practice. On this basis a project proposal was developed and funding secured.

In order to plan details of the workshop and consider what would have to be done beforehand to ensure that the workshop could work efficiently and achieve its objectives, a small group of 2 paramedics and 2 general practitioners was set up. The involvement of an A&E consultant was also considered but due to time constraints and the limited number available in Wales this was not possible. As the first major objective of the workshop would be to select clinical conditions that would be suitable for the development of pathways, it was important that criteria upon which the selection would be based were carefully identified. It was felt that since criteria identification could be a lengthy process, progress of the workshop would be facilitated if these criteria for clinical conditions selection could be specified in advance by this sub-group, although these clearly would have to be approved (or modified) by workshop participants. These criteria would need to cover not only a range of clinical factors such as the existence of an acceptable pre-hospital care intervention but also environmental/socio-economic factors such as whether the patient lived alone. The criteria would also have to be

ranked in order of importance, but it was felt that this should be left to workshop participants.

5.2.1 Setting clinical criteria

Providing there was acceptance of the principle of pre-hospital integrated care pathways and sufficient clinical conditions could be identified, a means of assessing clinical and non-clinical viability against a range of factors needed to be developed.

The criteria were broadly underpinned by Maxwell's (1984) six principles of quality of health care adapted to ensure relevance to pre hospital care. While Maxwell's principles could not fit exactly with the criteria developed they do provide a framework, as currently there is nothing else to consider which is valid. Criteria for assessing the appropriateness of the use of the emergency ambulance service are not well defined and are at worst entirely subjective (Weston 1992). Therefore in the absence of defined criteria Maxwell's 6 quality principles were modified for the clinical effectiveness groups to consider and are implicit on each criterion developed as follows: -

Appropriateness; the service or procedure is one that the individual or population actually needs. In pre-hospital care terms the appropriateness principle applied was whether there was an accepted pre-hospital or primary care intervention that could be used that was appropriate to the clinical condition being considered that meant the patient did not need to be referred to A&E. For example the primary care team or paramedic could manage the treatment and management of diabetes whereas trauma cases potentially need to be referred to an A&E department.

Accessibility; services are readily accessible and not compromised by distance or time constraints. It was felt that if paramedics already carried out the intervention then this was readily accessible to the patients concerned and was equally applicable in both urban and rural areas. In addition if paramedics do not carry out the skills required then the question could be posed are they available to paramedics? and can they be trained? If so then what are the barriers that potentially stop the intervention from becoming accessible to patients.

Effectiveness; the services achieve the intended benefit for the individual and for the population. To measure this it was felt that there needed to be acceptable outcome indicators that either already existed or were at least capable of being developed that

could assess the effectiveness of the interventions applied by paramedics. An example would again be diabetic patients who once treated by paramedics improve to the extent where they may refuse to go to hospital. It is possible to develop outcome indicators for this condition that are capable of being measured.

Acceptability; the service satisfies the reasonable expectations of patients, providers and the community. For present purposes, the focus of this principle was acceptability to the clinician i.e. that he/she accepted that the condition was one that could be managed by the patient under normal circumstances. As explained previously the acceptability to the patients (or community) was beyond the scope of the present research.

Efficiency; resources are not wasted on one service or patient to the detriment of another. The interpretation put on this statement is that if patients could be treated more appropriately in the primary care setting then arguably resources will be put to best use and are not being wasted.

Equity; services are fairly shared among the population who need them. If the concept of pre-hospital integrated care pathways were acceptable then could they be applied equitably to all patients with the same clinical condition irrespective as to whether the patient lived in a remote area or a city.

Although Maxwell's principles appear to be widely accepted (St Leger 1993, Ranade 1994), there are arguments as to what the key issue should be. Shaw (undated) states that *appropriateness* is the key issue, which all the rest depend on being present. If a procedure is not appropriate to particular patients' condition then it cannot be judged quality care. This argument epitomises the case for developing integrated care pathways, which would not only be appropriate to patient needs, but would also utilise resources effectively. Others however argue that *acceptability* should be the factor, which drives the rest. Koch (1990) for example argues that the ability to meet the patient's needs or expectations, or to be seen to make stupendous efforts towards this, will be a major quality predictor of the success of any service. Koch's argument may be invalid when considering pre-hospital care pathways as the evidence regarding inappropriate use of the ambulance service appears to be fairly conclusive (Morris 1980, Brown 1993, Hauswald 1999). Whilst these arguments may be valid as a generalisation to healthcare it could be argued that certain conditions require differing priorities.

For example when assessing the effectiveness of a local diabetic service, Williams (1989) stated that such a service cannot be measured without a clear idea of what it is setting out to achieve. The aim of Williams' study was not to examine how effectively clinical practice deals with the patient that present to it (accessibility), but how effectively a service is delivered to all diabetic residents of a specified locality (appropriateness and equity).

One aim of the development of pre-hospital integrated care pathways is to improve the way performance of ambulance services is measured. Given that performance of the pathways for each clinical condition will need to be measured against pre-determined targets, it was felt that the Welsh Office criteria for target setting should be part of the principle of selecting clinical conditions (Welsh Office Strategic Intent Document 1996). The three targets to improve the responsiveness of health services are

- That the service should be capable of being measured;
- Be capable of being achieved. As pre-hospital care interventions undoubtedly contribute to the holistic approach to patient care this has been interpreted as being capable of improving the patient's clinical status in pre-hospital care.
- And be capable of making a difference to patients or will there be a contributory affect to the potential reduction on mortality/morbidity rates. It is recognised that pre-hospital care alone cannot reduce mortality/morbidity but the question asks clinical professionals as to what their opinion is. It is recognised that morbidity from a patients perspective could also include unnecessary or inappropriate transport to hospital.

With the emergence of the need for clinical interventions to be based on evidence a further criterion asked the question as to whether there was an evidence base (e.g. is the clinical condition well researched)

Thus, based on Maxwell's principles and the Welsh office criteria described above ten criteria were developed by a small group of paramedics and General Practitioners independent of the Clinical Effectiveness Group prior to the workshop. This sub group identified the key questions that would enable workshop participants to select the clinical conditions selected. Key questions ensured that paramedic skills and primary care developments were considered together with the effect that these would have on

mortality and morbidity. The extent of evidence to inform these was carefully considered.

5.3 The facilitated workshop: Phase 1

A one and a half day workshop was held on the evening of the 7th May and all day on the 8th May 1997 at the Miskin Manor Hotel, Pontyclun, Mid Glamorgan. The accommodation was of 5 star standard, in order to create a positive impression with regard to the professionalism of the ambulance service and the importance of the topic.

The impact of group dynamics was considered and, given that the workshop would be attended by professionals who probably held fairly strong opinions, two main sets or functions were considered as being essential; task functions and maintenance functions (Mullins, 1991).

- ***Task functions*** directed towards problem solving, the accomplishment of the tasks of the group and the achievement of its goals.
- ***Maintenance functions,*** concerned with the cohesiveness of the group directed towards the building and maintaining the group as an effective working unit.

To ensure that the group would be effective, the agenda was very task orientated with emphasis on problem solving. It was understood that the level of interaction within the group would be determined by the structuring of channels of communication. Group performance and the satisfaction that would be derived by individuals would be influenced by the interaction between all members of the group. The facilitation of the group was therefore considered fundamental in ensuring that the objectives of the workshop were met.

The objectives of phase 1 of the workshop were thus

- to see if agreement with the principles of pre-hospital integrated pathways could be secured within the group
- to consider and accept/modify the criteria for selecting clinical conditions suitable for the development of pre-hospital integrated care pathways identified by the pre-workshop sub-group

- as a validity check against opinions clinicians were asked to score clinical conditions and on that basis, select/reject for development of pre-hospital integrated care pathways

5.4 Assessing External Validity - The Questionnaire

Although general practitioners will clearly always be the lead profession within primary care they are not the only relevant health professionals and it is therefore important for ambulance services to ensure acceptance of change across a spectrum of health disciplines. This approach is consistent with the principles of the White Paper "Putting Patients First" (1998), which outlined key objectives such as:

- removing obstacles to integrated care;
- developing local responses to take advantage of the greatly enhanced prospects for providing care in, and close to, patients' homes;
- aligning responsibilities better for clinical and financial decisions within local settings which are best able to deliver integrated programmes of care;

Therefore the views of other clinical and non-clinical members were considered important. As a further validity check to test whether the conclusions reached by those who attended the workshop were consistent with a wider group of healthcare professionals various methods of collecting data from a wider sample were considered and consideration was given as to what needed to be asked.

5.4.1 Methods considered

Interviewing – Interviewing was rejected as a measure mainly because of concerns over the ability of obtaining a representative sample across the required range of professions. Given that the workshop would explore 'in depth' the attitudes and ideas of professionals what was more important was to get a broad consensus of opinions.

Focus groups – This method was considered to have strong merits in that a full explanation could be given to each group, which could be multi-disciplinary. It would give the facilitator the opportunity to develop the argument for care pathways. However the method was excluded for two reasons. Firstly it would be logistically difficult to arrange for a range of professionals to meet at a pre-arranged time, together with the geographic spread of professionals. It was believed that confining the spread to a small

area might introduce a degree of bias due to localised pressures and politics at that time. Secondly resources and budgets were limited.

Questionnaire - Questionnaires were considered to be the most appropriate data collection method because the workshop provided several in depth issues that needed to be tested for confirmation from a larger group of professionals. Issues that were considered included;

- **Potential low response rate**. To overcome a low response rate several factors were considered in the design of the questionnaire:-
    - the interest of the sample in the topic of the study
    - the length and layout of the questionnaire
    - the covering letter explaining the purpose and relevance of the study
    - the methodology used to deliver the questionnaire.
- **Response bias.** It was recognised that those who returned their questionnaires might have attitudes, attributes or motivations that are different from those who do not (Moser 1971). Therefore effort was made to reduce potential response bias by sending follow-up requests approximately two weeks before the return date.
- **Lack of opportunity to clarify issues.** There was a fundamental difficulty in that should, for any reason, respondents not understand some questions, there would be no opportunity for them to have the meaning clarified. Therefore if respondents interpreted questions differently this would affect the quality of the information provided. Consideration was duly given to how the questionnaire would be constructed i.e. open or closed questions, or by using attitudinal scales. Given that clinicians may argue that a clinical intervention or development could work but might then say " but it depends on" suggests that closed questions might not be appropriate. Therefore an attitudinal scale was considered more appropriate which although arguably restricts clinicians views allows them to express a strength of agreement or disagreement.
- **Spontaneous responses would not be allowed for.** This was overcome by allowing respondents the opportunity to add additional comments should they wish.

The purpose of the questionnaire was to assess whether the concept of pre-hospital care pathways was acceptable to a broad range of clinicians and whether they can provide acceptable alternative to conventional methods of pre-hospital patient management. Due

to budget and logistical restraints it was decided that the views of a range of 200 professionals would be sought.

5.4.2 Questionnaire design

Two types of attitudinal scale were considered; the Likert and Thurstone scales. The Likert scale is the most commonly used scale and the easiest to construct (Kumar 1996). It is based on the assumption that each statement/item has equal attitudinal value, importance or weight in terms of reflecting an attitude towards the point in question. This was preferred over the Thurstone scale which calculates a 'weight' or attitudinal value' for each statement calculating on the basis of rating assigned by a group of independent judges. The fact that the Likert scale does not measure attitude *per se* (Bowling 1997) was appreciated, but the fact that it does help to place different respondents in relation to each other in terms of the intensity of their attitude was considered important in determining the strength of agreement towards integrated care pathway development. An important feature of Likert scales is that reported scores can be summed to produce a single, uni-dimensional overall score. Likert-type scales, use the Likert format but do not possess this attribute. The scales used here should therefore be called Likert-type.

5.4.3 Considerations in constructing a Likert scale

The first consideration was the classification as to how attitude was to be measured. It was recognised that the finer the distinctions that can be made between respondents responses, the greater the precision of the measurement (Bowling 1999). A five-point category scale was selected that enabled respondents to express their attitudes to questions as follows: -

Strongly agree--------agree---------Uncertain--------disagree---------strongly disagree

Before the main questionnaire was sent a small number of local health professionals (2 GPs 6 Paramedics and 4 A&E Nurses) were asked to complete a pilot questionnaire and to comment on questionnaire design the scope of questions asked and their validity to the development of pre-hospital care pathways. Minor adjustments to the grammatical presentation of the questions were made. Overall, the pilot sample reported that the questions were both concise and easy to answer. In addition it was believed that the

questions encouraged a depth of cogitation with regard to this concept that previously may not have occurred.

5.4.4 Sample selection

Equal numbers of General Practitioners and Accident and Emergency consultants were surveyed, together with primary and secondary nursing staff and paramedics. A total of 200 questionnaires were sent 50 to each professional group.

The Local Medical Committee selected the 50 representative GPs and assisted in the dissemination of questionnaires. Nurses who were members of the Local Clinical Effectiveness Committee, agreed to use their network to select a sample of nursing staff. It was recognised that in both these circumstances there was a potential for selection bias in that there was no agreed method regarding who received questionnaires. Paramedics were selected from the former Mid Glamorgan Ambulance NHS Trust (now part of the Welsh Ambulance NHS Trust) by selecting every fourth member from information supplied by the personnel department (if information was supplied in alphabetical order, or by any other systematic format, then there was a potential bias in this method). Due to the relatively small numbers of Accident and Emergency Consultants within Wales, consultants were randomly selected from the NHS yearbook 1997.

A covering letter was sent to all potential respondents together with a self-addressed, pre-paid envelope.

5.5 Questions

There were five sections to the questionnaire. Each consisted of a statement explaining the background regarding each section, followed by a series of sub statements to which respondents were asked to express their strength of agreement. The sections began by assessing the degree of agreement with the belief that some attendance's at accident and emergency departments, were currently inappropriate and that the development of paramedic skills suggested that alternatives were now feasible. These progressed to suggestions that the alternatives could involve treatment in primary care centres and that pre-hospital care pathways could be an ideal way of representing effective delivery of health care, albeit for specific clinical groups. On the assumption that there was

acceptance of the principle of care pathways the questionnaire then sought agreement as to whether alternative treatment was appropriate for specific clinical groups. Even those recipients who did not necessarily agree were asked to complete these questions. Although not directly part of the study clinicians who were part of the workshop requested that the questionnaire also asked respondents to comment as to whether patients were likely to listen to and have confidence in paramedics advising them not to attend accident and emergency centres but to accept an alternative pathway to effective care. Their belief was that although pre-hospital care pathways may provide an alternative to current practices patient views would need to be considered if any changes were to work.

SECTION ONE

Statement

"Evidence exists to suggest that as a result of the development of paramedic skills, some patients with medical conditions treated by paramedics on scene receive effective care to the extent where it is not necessary for them to receive further treatments in Accident & Emergency centres".

The questions in this sub section asked respondents whether or not they agreed with the consensus that '999' calls contributed to the argument of inappropriate attendances at A&E departments. If they agreed then they were further asked whether improved paramedic skills could provide an opportunity for alternatives, and possibly enabling paramedics to totally manage some clinical conditions thereby reducing the need to transfer to a care facility. Finally in this sub section respondents were asked whether they felt that paramedic skills would improve if they were aligned more closely with primary care.

Question 1

A significant percentage of '999' calls contribute to inappropriate attendances at A&E departments?

The question was asked as some patients who arguably contribute to inappropriate attendances at A&E departments are conveyed by ambulance, due to the lack of recognised alternatives. There is a limited amount of published literature that evaluates the appropriateness of '999' journeys to hospital, with work by Morris (1980)

representing perhaps the first detailed studies. Comparable studies undertaken by O'Leary (1987), Gardner (1990), Koenig (1996) and Billittier (1996) all indicate high percentage of journeys classified as unnecessary.

The relevance of this question was to assess whether the respondents felt that in their professional opinion they agreed that a significant number of '999' calls contributed to inappropriate attendance's at accident and emergency departments. If they felt that there was not a problem with A&E attendances it is unlikely that they would consider alternatives as being necessary or desirable.

Question 2

Paramedic diagnostic skills should be improved, allowing judgements to be made as to where to transfer emergency '999' patients.

Two published reports suggest that paramedic skills should be improved allowing them to make judgements as to where patients would be most appropriately treated. The NHS Executive report (1995) *"Opportunities in Emergency Health Care"*, when looking at the scene of incident care, suggested that: -

> *" Increasing the discretion that ambulance staff are allowed to exercise should be considered. Greater use of judgement, guided by evidence based protocols, would help in deciding whether to bypass a local facility and go direct to a more appropriate one".*

The considerations of this report are reinforced by the NHS Executives (1996) report *" Developing Emergency Services in the Community"* who felt that: -

> *"The role of the paramedic could be significantly enhanced. The paramedic could become more skilled in emergency work with wider discretion about initiating treatments and prescribing drugs. Greater independence in choosing the best destination for their patient could be useful, as would the ability to diagnose death".*

As paramedic protocols and standards are set and agreed by Local Paramedic Steering Committees the study question was asked to obtain a consensus as to their view of improving paramedic diagnosis skills should alternatives to A&E be appropriate.

Question 3

There are instances where patients receiving a '999' attendance, have clinical conditions, which can be managed totally by paramedics (with strict clinical and non-clinical criteria) and would not need to be taken to A&E departments.

If studies undertaken by Morris (1980), O'Leary (1987) and others are taken as being conclusive and the reports by the NHS Executive accepted, alternatives need to be considered. It could be argued that increasing workloads for primary care is not acceptable without investment in additional resources. Therefore, an alternative could be to develop a series of protocols and guidelines enabling paramedics to treat and leave patients at their home. To enable this to become practice there needs to be a set of clinical conditions defined, which could potentially be managed in the community rather than necessitate transfer to hospital.

Question 4

Paramedic diagnostic skills would improve if they worked alongside primary care teams

Paramedics generally have excellent working relationships with accident and emergency staff with A&E Consultants forming an integral part of Local Paramedic Steering Committees. Although primary care professionals do form part of these committees the focus tends to be on Trauma, Anaesthetics and Cardiac Care. Should alternatives be considered it is probable that paramedic skills would need to be enhanced to enable them to reach a more definitive diagnosis enabling them to work more alongside primary care practitioners. This would arguably be necessary as paramedics are not generally exposed to medically ill patients for periods long enough to assist with diagnosis. The nature of the work and the way that protocols have been developed means that paramedics are more concerned with treating signs and symptoms and ensuring that the patient's Heamodynamic State is maintained. This is also the case with medical emergencies. This question assesses whether clinicians feel that the mechanism of paramedics working alongside primary care teams would improve their diagnostic skills.

SECTION TWO

Statement

"The Emergency Care Handbook produced for the NHS by the Anglia and Oxford region suggests that there should be a closer link between primary care and the ambulance service. There are several GP co-operatives, or centres being developed throughout the United Kingdom in partnerships with ambulance services and other

health disciplines which could provide an alternative, together with improved skills for paramedics determining where patients most 'clinically effectively' managed".

The purpose of this section was to consider alternative treatment centres should the principle that paramedic skills and closer working relationships with primary care be accepted. It considers the link between GP's, Primary Care Teams and their involvement in the development of clinical protocols for paramedic interventions intended to focus care delivered in the community environment. In addition the desirability of integrated Information technology is considered as a method of potentially improving communications between both primary and pre-hospital care providers.

Question 5

Primary Care Emergency Centres could be one of the main facilities for processing out of hours emergency care and ambulance responses to inappropriate '999' calls.

There is evidence to suggest that once patients have used the primary care centre they are more likely to use it again. For example a study conducted by Rajpar (2000), to determine patients' reasons for choosing between primary care out-of-hours centres and accident and emergency departments identified a variety of reasons why patients chose A&E departments. Of 102 patients interviewed 62% of A&E attendees were unemployed people compared with 41% who presented at primary care centres. White people are more likely to attend A&E compared with Asians and unemployed were more likely to attend A&E. Some 46.3% of A&E department attendees had not contacted their GP before attending; 81.3% of first time users of the out of hours centre found out about it on the day of interview. There was also a differing perception of possible waiting times with those attending A&E believing that the waiting time at the primary care centre would be 6.3 hours (median) compared with a median perceived time of 2.9 hours by those actually attending the out of hours centre although the actual time was much less. There is a direct correlation between the work of Rajpar and that of Lewis (1981) who argues that the continued free access to A&E departments by the public appears to have resulted in diminished control by health care professions. The Health Belief Model as developed by Rosenstock (1974) suggests that patients will seek help from where they believe it will be best delivered, perhaps through tradition rather than evidence based. Rajpar concluded that although patients should be encouraged to

contact their GP before A&E departments for non-life threatening conditions the perception of waiting times might be an important reason for their choice of service.

Question 6

Such centres should be developed to accept referrals by paramedics

Changes in diagnostic and treatment technologies, rather than policy interventions, are the most potent force leading to the substitution of one form of healthcare service for another (Hensher 1999). Most patients admitted to hospital in the United Kingdom have no alternative but to be admitted: they are severely ill and require interventions that are available only through the high technology facilities of acute hospitals. In studies looking at the use of acute hospitals, however, a sizeable minority of admissions and particularly, days of stay are classified as inappropriate. A tiny number of patients according to Coast (1995, 1996) may require no care at all, and they could be immediately returned home. For those patients with pre-existing conditions, for example asthma or diabetes, emergency admission to hospital can be prevented by better management of the disease to prevent acute events occurring and by better management of events once they occur. Hensher (1999) believes that prevention of emergencies is largely the responsibility of professionals working in primary care and in the community. However she also believes that there should be closer involvement of and commitment from patients themselves together with the adoption of evidence based protocols agreed by clinicians in which patients have confidence.

Question 7

There should be a closer working relationship between Primary care and Pre-hospital paramedic care

Should the concept of primary care centres be considered GPs would need to play a greater role in developing guidelines and protocols for paramedics. Although there is a good relationship between primary care and paramedics it could be argued that the relationship is generally not as close as that of paramedics/secondary care.

The Welsh Office report 'Primary Care' The Way Forward in Wales recognises that there is a general acknowledgement that the general practitioner should retain the present pivotal role in the Primary care Team. However opinions are divided as to whether the GP should be the conductor of the orchestra setting the relationship and

pace of the other players, or as a leader, relinquishes their leadership in circumstances where another member of the Primary Care team is better qualified

Extending this argument to the development of paramedic protocols suggests that primary care professionals should assist in the development and monitoring of protocols that are perhaps pertinent to those patients that could attend Primary care centres.

Question 8

GPs should develop clinical protocols for paramedic interventions to allow them to work more closely with Primary care Teams, achieving greater care focused on the community.

Paramedics currently work to standards and protocols set by Local Paramedic Steering Committees. The recent government white paper *The New NHS Modern Dependable* emphasises the need for locally based services and greater collaboration between health professionals in developing clinically effective services. Should primary care centres be developed to accept referrals from paramedics then arguably they need to play a more prominent role in developing clinical protocols for pre hospital care. It is not envisaged that this is carried out in isolation of secondary care or with a lesser role for secondary but an enhanced one for primary care.

Question 9

The use of integrated information technology systems between primary and pre-hospital care should improve communications and would be a desirable objective.

There is increasing emphasis on the need for effective communications between various health groups with greater use made regarding information technology systems. Examples of how systems could be used are developments of the national patient number, telecommunication links between ambulance services and Coronary Care Units (CCUs) facilitating direct access to CCU for those patients suffering acute myocardial infarction (AMI) and the use of telemedicine.

SECTION THREE

Statement

"Care pathways identify the optimal sequencing and timing of interventions by physicians, nurses and other staff for a particular diagnosis or procedure. They are

designed to minimise delays and improve the quality and value of patient care. Care pathways have been shown to reduce variation in the care provided, facilitate expected outcomes, reduce delays and improve cost-effectiveness (Kitchener 1996)."

The following questions test the hypothesis that care pathways can be developed for pre-hospital care, albeit with the need to potentially strengthen links with primary care. This section is aimed at assessing acceptance regarding how care pathways can be used in the delivery of patient care and the potential for developing pre-hospital care pathways. The section recognises the possibility of an increase in the workload of primary care teams and gives the opportunity for respondents to indicate whether they feel that workloads would increase or not.

Question 10

The use of care pathways represents an effective way of delivering health care

There is a dearth of evaluative research on pathways of care, which has been undertaken in the UK. The National Pathways Association recognises that if there is to be a wider acceptance for pathways, there needs to be evidence collected showing that they are of benefit.

Question 11

It is possible to develop care pathways for the attendance, management and if appropriate subsequent transfer for patients attended to as '999' emergencies by paramedics.

Paramedics work within protocols, which are largely set by clinicians through local paramedic steering committees. As pathways determine locally agreed, practice based on guidelines and (where possible) evidence, pathways could be seen as an extension of existing protocols and standards. The question focuses on the management and 'if appropriate' transfer to hospital thereby gaining some indicative measure of clinical acceptance regarding the non-transfer to A&E departments. It is recognised that existing clinical standards and protocols may not be robust enough and would therefor need to be developed with clinical input.

Question 12

Pre-hospital care pathways would increase the workload of General Practitioners.

Government policy is to shift the emphasis from secondary care to primary care with one of its objectives being

> *"To develop local responsiveness to take advantage of the greatly enhanced prospects for providing care in, and close to, patients homes"*
> (NHS Wales Putting Patients First)

The greater role that GPs will play together with government objectives suggests that any new initiative may be viewed with suspicion unless fully supported by all parties from the outset. The attitudes and knowledge of hospital based staff about the capabilities of those in general practice may be important obstacles to continuity of care and the quality of communication at the primary-secondary care interface (Dale 1999). Clinicians in secondary care appeared to be reasonably negative towards general practitioners with regards to, GP's accessibility within and outside normal working hours, perceptions of patient's satisfaction with GP services, GP's effectiveness in educating patients about use of services and the frustrations and lack of reward of treating primary care patients. However Dale did find that there appeared to be some bias as the overall trend was for attitudes to become more negative during Senior House Officers period of employment working within A&E departments, particularly those intent on hospital specialist careers. These perceived attitudes together with where patients believe they will receive the best treatment may present as obstacles in the development of pre-hospital care pathways but it is believed are not insurmountable.

Question 13

Pre hospital care pathways may increase the workload of primary care teams.

The same principles were applied to primary care teams as GPs. Should pathways be developed that would involve primary care input then arguably their workloads would increase, as work would potentially be delegated. The evidence for this perhaps lies in the Welsh Office initiative ***'Primary Care The Way Forward In Wales'*** where the appropriate use of skills is recognised. It is believed that there is little dissent from the proposition that in ideal conditions the service could provide more health care than at present. It is argued that GP's feel hampered on the one hand by bureaucracy and on the other by increasing patient demands, which often does not call upon the skills appropriate to a general practitioner. The document suggests that the future ought to see a greater involvement of, particularly nurses, but also other professionals. It is believed that this would require an element of patient education and a greater flexibility on the part of all professionals to understand and rely on the contributions made by each other.

It is understood that there may be barriers as remuneration systems do not always facilitate the employment of other professionals or support staff and GP's who are not fundholders do not always have the flexibility to choose a method of treatment, which would minimise the calls upon them.

SECTION FOUR

The following questions consider the desirability of pre-hospital care for specific clinical conditions as identified by the Local Clinical Effectiveness working group.

Question 14

Integrated care pathways combining paramedic and primary care expertise are desirable in today's health service

This question attempts to assess the strength of agreement/disagreement regarding integrating paramedics more towards the primary care sector. Traditionally pre hospital care has worked closely with secondary care and should care pathways be developed allowing paramedics to manage patients at home referring them to primary care would mean jointly developed protocols enabling this to happen.

Question 15

It is possible to develop pre-hospital care pathways for some clinical conditions enabling some patients to remain at home, or to be returned to their home following treatments by paramedics for the following conditions.

Respondents were asked to comment on those conditions selected by the Local Clinical Effectiveness Team (LCET), which are to be developed into draft care pathways. The question was a general statement rather than a consideration of clinical criterion, as these would be developed during the development of care pathways.

Each condition selected by the CET was analysed individually rather than collectively. This ensured that each clinical condition was shown, as a more accurate reflection of the health professionals' considerations rather than a skew of any of the data with inappropriate bias.

Question 16

The development of care pathways for these conditions could potentially improve clinical effectiveness for these groups of patients.

One of the main objectives of developing care pathways is to improve the clinical effectiveness of the particular condition by improving the management process with quality indicators to enable effective audit.

Question 17

Care pathways, initiated by paramedics through '999' attendances would improve out of hospital management for the above conditions.

The current method of managing these groups of patients is to generally respond, treat and transfer to hospital regardless of the patient's general condition. There are those groups of patients who refuse to attend hospital following on scene treatment and although some ambulance services advise the patients General Practitioner the intervention and management may not form part of the patients record, unless local arrangements exist. Therefore, some patients are being attended, treated and discharged on scene without the GP's knowledge. One of the perceived benefits of integrated pre-hospital care pathways is that the current gap, whereby the General Practitioner is not made aware that one of their patients has been treated as a '999' emergency, will be closed as GP's will be advised by either letter or use of Information Technology when a patient has been attended and managed by a paramedic.

SECTION FIVE

Statement

"It is realised that patient acceptance of change is necessary if any new development or change in existing practice is to be accepted".

Although patient surveys are outside the remit of this project clinicians were given the opportunity to express their views regarding patient acceptance of care pathways managed by paramedics. The project follows the governments initiative of caring for people at home although it should be remembered that these are patients who have been responded to as '999' emergencies whose expectations may be hospitalisation. The power of the media has arguably influenced people's perspective of paramedics who, it is believed, are held in high esteem. Whether patients would welcome a change to

'accepted' practice is uncertain and would be wholly subjective at this stage. However it is believed that the following questions give some indication of clinicians' views.

Question 18

Patients would welcome the opportunity to remain at home for specific conditions.

The workshop promoted debate as to whether patients would accept alternatives to accident and emergency care and also whether those who attended hospital regularly would accept the opportunity to remain at home. There was a consensus that those who attended hospital for treatments such as diabetes would prefer to remain at home and be treated by community nurses rather than be subjected to potentially long delays at A&E departments.

Question 19

It is probable that patients will view alternatives to A&E with suspicion.

Again the workshop debated that patients who were treated at home would maybe believe that they would receive less treatment than if they attended a hospital environment. This belief was primarily due to the fact that patients attending hospital would be surrounded by equipment and personnel that arguably gave a feeling of security.

Question 20

Patients would accept advice from paramedics advising them to remain at home following treatments given within clinical guidelines.

It was generally accepted by the workshop that patients responded to paramedics due to media awareness and the much-publicised work of paramedics. However the workshop questioned whether patient confidence would extend to accepting paramedic advice that following on scene interventions there would be no need to attend A&E.

A Chi squared test was applied to determine if the differences in the proportions of the responses given to the various questions were significantly influenced by the profession of the respondents. In order to perform this significance test the responses were re-categorised into two groups. The "positive" group contained those responses that had previously been categorised as "agreed" or strongly agreed", and, similarly, the

"negative" group contained those that disagreed or strongly disagreed. Those who were uncertain were excluded from the analysis.

5.6 The facilitated workshop phase 2

The focus of the second phase of the workshop was on the development of a pre-hospital protocol that could be used as part of an integrated care pathway for the identified conditions.

5.6.1 Pre-hospital care protocol design

The design of the protocol needed to consider those factors, which are appropriate to the ambulance service such as:

- receipt of call and pre arrival advice
- existing dispatch protocols in accordance with new response standards, the conditions selected may be responded to either as category A or category B depending on information received. Category A requires an ambulance to arrive on scene within 8 minutes, category B within 18 minutes. In addition pre arrival instructions (dispatch protocols) have been included as part of the pathway together with on scene management.
- on-scene paramedic treatments in accordance with both nationally accepted treatment protocols developed by JRCALC and those agreed locally by paramedic steering committees
- clinical criteria as recommended by the Local Clinical Effectiveness group at the workshop together with the 'best evidence' that could be found
- non clinical factors again agreed at the workshop

5.6.2 The Evidence Base

To ensure that the protocols are evidence based the guidelines developed by the North of England Guidelines Group and the Royal College of General Practitioners (RCGP) Clinical Practice Evaluation Programme (CPEP) (1996) were considered. Although not designed for pre-hospital care the principles applied by CPEP have been adopted and applied to the construction of pre-hospital care protocols. The JRCALC guidelines, which were developed specifically for pre-hospital care, were also considered.

5.6.3 Dispatch protocols

The pathways developed used the pre arrival instructions and dispatch protocols from the Advanced Medical priority Dispatch (AMPDS) which is used extensively throughout the world as the preferred dispatch system. Priority dispatch systems have the potential to enable life threatening emergency calls to achieve faster responses by focusing resources on them, and in this way they could help save lives and result in benefits for patients. No priority system however can be expected to identify such cases without wrongly identifying some calls as life threatening, and also failing to identify some possible life-threatening emergencies. Nicholl (1996) estimated that approximately 1 in 560 '999' calls to ambulance services may be under-prioritised in this way by the emergency medical dispatch system, but after eliminating remediable causes this means that just 1 in 2200 calls may be potentially serious under-prioritisation.

It was suggested by Nicholl (1996) that in order to eliminate remediable causes of under-prioritisation consideration should be given to

- assigning all head injuries to a high or medium response category
- assigning all incidents involving children under five to a medium priority Basic Life Support (BLS) response category, or a higher category
- the need to emphasise the importance of identifying the main complaint in the training and audit of dispatchers implementing the systems and
- whether the systems should take circumstances other than the patients immediate clinical prognosis into account in assigning a 'low' or 'medium' priority
- whether the systems should assess explicitly the reliability of the information passed by the caller, and where there is any doubt about this assign a medium priority or high response if thought necessary.

Therefore it is likely that those calls requesting '999' assistance for diabetes, asthma and convulsions are likely to be assigned a high priority response due to there clinical complications if left unattended.

5.6.4 On-scene protocols

Current on scene protocols are mainly derived from evidence based guidelines produced by the Joint Royal Colleges Ambulance Liaison Committee (JRCALC) or in the

absence of guidelines from consensus amongst clinical experts from local Paramedic Steering Committees. The JRCALC National Clinical Guidelines sub-committee provides the main JRCALC committee and thereby the Ambulance Services in England with evidence based clinical guidelines using, where available, the published evidence base. Where there is no published evidence the sub-committee endeavours to use available expert clinical advice to formulate the guidelines. The sub-committee also develops standards and performance indicators for each guideline. The scope of the sub-committee encompasses all aspects of clinical care delivered by Ambulance Services and takes a comprehensive view of all clinical activities to ensure that the provision of health care within Ambulance Services remit is deemed to be best practice (JRCALC 2001).

5.7 Determining Review Criteria

As no review criteria currently exist these would have to be developed for the clinical conditions identified and have focussed on the process, treatments and outcomes. Baker (1995) had previously developed a useful framework for developing review criteria for guidelines. Although the current review criteria would be applied to pathways, as opposed to guidelines, it was felt that the principles proposed by Baker could be applied although they would have to be adapted to make them more appropriate to pre-hospital care.

Baker suggested that review criteria could be used by both purchasers and providers to monitor compliance with the recommendations of guidelines when considering the development of quality indicators within service level agreements. This represents a useful way of shifting the ambulance service away from response standards to the clinical contribution that paramedics have on clinical outcomes. By developing review criteria based on the framework of quality proposed by Donabedian (1980) performance could be measured against mutually agreed standards. This suggests that by applying Donabedians concept structural issues such as resource availability and how they are being used can effectively be audited against agreed criteria. More important, is the second principle suggested by Baker that is relevant to both process and outcomes.

Baker argued that review criteria must be an essential part of clinical audit so that clinicians themselves can evaluate their compliance against guidelines. Thus in the

present case, paramedic's must be able to monitor their compliance against protocols through audit. In audit, information about performance is collected for comparison with explicit criteria, and feedback of the findings to clinicians is then used either alone or in combination with other strategies to encourage appropriate changes in performance. When applying this to ambulance services it must be remembered that current measurement is speed of response and it may well be that this remains as part of the review criteria. However it is arguably more important to develop review criteria that measure effectiveness of the service through what the paramedic actually does to the patient and the effect that the treatment has had.

What the review criteria seeks to achieve is the measurement of the differing facets of the delivery of the service i.e. whether resources are appropriate, being used to best effect or are insufficient to meet the needs of the service. In addition when considering the process the review criteria provides a means of evaluating paramedic effectiveness against agreed protocols and enables judgements to be made as to whether protocols are being adhered to, ignored or indeed whether they are poorly written or not understood. It may also be appropriate as a principle to measure the percentage that receives an intervention against those who require it.

The measurement of outcomes is similar although these refer largely to the clinical and non-clinical criteria of the protocol. The design of the protocol looks at the end result i.e. how many patients were transferred to hospital after the clinical and non-clinical criteria have been applied. It is implicit in that if the patient has been left at home or referred to their GP after paramedic intervention then this represents effective paramedic outcomes. However it is recognised that this cannot be measured in isolation and must be considered as part of a pre hospital integrated care pathway.

It is recognised that there are unanswered questions, which were beyond the remit of this study, such as the medico-legal implications, what training would be required and what the clinical risk may be. The next chapter considers the results of the methodology applied.

CHAPTER SIX

6. RESULTS

6.1 RESULTS OF THE WORKSHOP: Phase One

Several interesting discussions took place at the workshop with each professional expressing their own views as to how patients who fell within the criteria should be managed. These ranged from not responding at all and just giving advice over the telephone to empowering patients to take responsibility for their own well being i.e. once attended by a paramedic a letter could be left by the paramedic placing the onus on the patient to report the interventions to their own GP. Despite there being some agreement as to the more radical views there was an overwhelming consensus that the clinical risk was potentially too great to leave the patient without strict protocols for paramedics to follow. Therefore it was generally accepted that integrated care pathways encompassing pre-hospital care and primary care provided an appropriate mechanism for reducing the need for patients to be transported to A&E departments whilst minimising clinical risk.

6.2 Threats to Professional Autonomy

During the workshop some General Practitioners had raised concerns regarding developments, which could potentially impinge on their professional autonomy. This dilemma facing clinicians would appear to be a general problem, with a conflict facing those professionals who have a desire to become involved in new initiatives, balanced against their need to preserve that, which already exists. Roland (1995) suggests that GP's are facing threats both from within general practice and from a growing body of specialists working from within the community, which could lead to fragmentation of primary care. There is much anecdotal evidence to suggest that many professionals feel that they are potentially losing 'authorship' of their actions, not only with the loss of morale, but in the longer term the subtlety and quality of their care deteriorating (Seedhouse 1995). However those who attended and took part in the workshop were by and large willing to accept that there were alternatives to traditional practices and broadly supported the concept of pre-hospital integrated care pathways.

6.3 Clinical Conditions

The clinical conditions considered were based on a comprehensive set of clinical standards developed by the former Mid Glamorgan Ambulance NHS Trust, for analysis of paramedic outcomes. These had been developed in house by the Trust and were accepted by the Trust's Paramedic Steering Committee consisting of consultant clinicians covering a range of health disciplines. The clinical standards were developed using a modified version of Donebedian's (1980) framework for quality consisting of a process and outcome. The structure element of Donabedian framework (the first element) was omitted, as it was not the intention here to evaluate the structural aspects of the service. It was replaced instead by 'standards', which simply refers to what the patient could expect. Process referred to those treatments carried out by the paramedic according to protocols and outcome was that which could be expected. The outcome in this case is a measure of the extent to which the patient improved due to treatments, deteriorated or there was no change. These are measured by comparing first baseline checks of pulse rate, level of consciousness, breathing rates, blood pressure, and pain assessment against final observations after treatment. These measures are crude but in the absence of any alternatives give some credible information as to efficacy of treatments and were accepted by clinicians throughout Mid Glamorgan as being a valid measure for pre-hospital care.

Although evaluation of treatments is an essential component of the rational approach to decision making it could be argued that the principles of monitoring health-care inputs, measuring the extent to which the expected outcomes have been achieved and assessing the extent of any unintended or harmful consequences of the intervention as outlined by Coulter (1992) are not appropriate to pre-hospital care. When effectiveness is measured solely by reponse times it is possible to evaluate the ambulance service in isolation from the rest of the health service. However if, as argued here outcomes are a more appropriate way of assessing the effectiveness of the ambulance service then it is no longer possible to consider the service in isolation. Although a patient is potentially only in the care of paramedics for a few minutes as opposed to several hours or days if the ambulance services role is considered as part of an integrated care pathway its effectiveness is more capable of being measured.

The workshop were asked to identify those clinical conditions attended by paramedics as '999' emergencies using the clinical standards already developed by the former Mid Glamorgan Ambulance Service which they felt: -

- could be diagnosed, treated and referred to other health professionals in the primary setting or could be left alone
- must be referred to an accident and emergency department or coronary care unit
- they were unsure and needed more discussion

Figure 2 shows those conditions (category 1) which the group felt could be potentially selected for development into pre-hospital care pathways. There were several identified in category 2 which were believed to have the potential for development into care pathways, however there were several potential barriers which would require further investigation before being included in this study, such as clinical acceptance, and the lack of research or the need for more evidence that paramedic protocols were robust enough to make them viable for further research.

Clinical conditions that fell within category 3 were those where there was a consensus that the patient would need to be transferred direct to a specialist unit such as those with Coronary Care Units or A&E departments.

Fig 2

GROUP 1	GROUP 2	GROUP 3
Asthma Diabetes Convulsions Catheter problems Psychiatric problems Syncope/fainting Hyperventilation	Anaphylaxis Bradycardia Cardiac conditions without pain Chronic respiratory conditions Epistaxis Infectious diseases Maternity labour Non traumatic abdominal Ophthalmic emergencies Terminal illness	Cardiac Arrest Cardiac Arrhythmia's Cardiac pain Caissons disease Cerebral Vascular Accident Gastro-intestinal haemorrhage Gynaecological emergencies Obstetric emergencies Acute respiratory emergencies Poisoning/overdose Retention Sickle Cell disease Suspected DVT Unconscious patients Back pain/Renal colic Hyperthermia Hypothermia

6.4 Non-Clinical Criteria

It was recognised early during the workshop that the decision to either leave patients at home or refer to others cannot be made solely on clinical grounds and there may be non-clinical factors that also needed to be considered. The criteria developed included the following questions: -

- can the condition be clinically managed in the primary care setting?
- and is the condition capable of being managed by the patient under normal circumstances?

When health professionals came to score each of the ten criteria for each clinical condition chosen, they felt that this could not be achieved with any real meaning, which would allow conditions to be compared. Their view was that although the criteria were valid, each one would have different significance for each condition. It was agreed therefore that each of the ten indicators should have equal status and were implicit in developing criteria questions, with each of the questions having high, medium or low scoring applied to them.

When the scoring process was applied to conditions in category 1 the following scores were reached for each clinical condition: -

Clinical Condition	Workshop score (out of possible 100)
Convulsions	88
Asthma	95
Diabetes	88
Catheter problems	70
Psychiatric patients *	
Syncope/fainting	95
Hyperventilation	95

*Psychiatric patients were excluded on the basis that the scoring process was not considered appropriate for these groups of patients, although the consensus was that pre-hospital care pathways were desirable for these patients.

Scoring

0-30	not acceptable for consideration of a pre-hospital care pathway
31-60	would require further discussion before being acceptable

61-100	those clinical conditions that scored between these scores were considered acceptable for further review and potentially for development of pre-hospital care pathways

All six conditions scored above the threshold of 60, which confirmed that the choices made by clinicians were good, when scored against set criteria.

6.5 Questionnaire Analysis

As a further validity test that the conclusions reached by those who attended the workshop were consistent to a wider group of health professionals a questionnaire was sent to 50 General Practitioners, 50 Accident and Emergency Clinicians, 50 Paramedics and 50 Nursing staff.

A total of 126 questionnaires were returned representing an overall response rate of 63%. The number of response (rates) by professional groups was as follows;

- General practitioners = 33 (66%)
- Accident and Emergency Consultants = 32 (64%)
- Nurses = 31 (62%)
- Paramedics = 30 (60%)

Although approximately one third of the sample did not respond, the number of non-respondents was evenly distributed between the four professional groups.

A Chi squared test was applied to determine if the differences in the proportions of the responses given to the various questions were significantly influenced by the profession of the respondents. The *p value* is given at the beginning of each question.

As shown below, there were very few statistically significant differences between those agreeing and disagreeing with the statements (χ^2). This may in large part have been due to the small sample size. Accordingly the discussion highlights trends, which may reflect the views of the population of professional even where these do not achieve statistical significance. Graphs plotting each set of statement results are shown in appendix 1

SECTION ONE

Statement 1

A large number of '999' calls contribute to inappropriate attendances at A&E departments?

($n = 126, p = 0.014$)

Overall 46% (58) agreed with the statement and 26% (33) strongly agreed. There was however a statistically significant difference between groups with a trend toward less agreement by A&E consultants where 47% agreed or strongly agreed as compared with nurses (71%), GPs (82%) and paramedics (90%). There was also a trend for greater strength of agreement among the paramedics where the percentage strongly agreeing exceeded the percentage agreeing (53% v. 37%). This can be compared with GPs (21% v. 61%), nurses (19% v. 52%) and A&E consultants (13% v. 34%).

These results however could have been influenced by different interpretations of what is considered to be a "large" number as well as what is considered to be an "inappropriate" attendance, as neither term was defined. In particular this might explain the reported differences between professional groups - particularly between paramedics and A&E consultants. Nevertheless the broad message here that 999 calls are regarded by many as contributing to inappropriate A&E attendances is consistent with the results of other studies (Weinerman 1996, Gifford 1980, Stratmann 1975).

Overall there were only 3% (4) who strongly disagreed with the statement compared to 10% (12) who disagreed. The highest amongst professional groups were A&E consultants with 6% (2) strongly disagreeing compared to 21% (7) who disagreed other results were nurses (3% v 13%), GP's (only 1 disagreed) and paramedics (only 1 strongly disagreed).

Statement 2

Paramedic diagnostic skills should be improved, allowing judgements to be made as to where to transfer emergency '999' patients?

(n=123, p= 0.52)

There appeared to be strong views that paramedic diagnostic skills should be improved. Overall 55% (68) agreed with the statement and 27% (33) strongly agreed. Although

between-group differences did not reach statistical significance difference there was a trend towards less agreement by nurses where 74% agreed or strongly disagreed compared to A&E consultants (80%), GP's (80%) and paramedics (90%). Although there was less agreement amongst nurses 29% (9) strongly agreed with only 45% (14) agreeing which was higher than other professional groups, GP's (27% v 55%), A&E consultants (23% v 58%) and paramedics (21% v 62%).

Whilst there was a consensus that paramedic diagnostic skills should be improved these results could have been influenced by differing interpretations, as the statement was not specific in identifying what diagnostic skills should be improved.

Overall there were only 7% (9) who strongly disagreed/disagreed with the statement with only I nurse strongly disagreeing. There were 3 A&E consultants who disagreed with 1 GP, 3 nurses and 1 paramedic.

Statement 3

There are instances where patients receiving a '999' attendance, have clinical conditions, which can be managed totally by paramedics (with strict clinical and non-clinical criteria) and would not need to be taken to A&E departments?

(n=124, p=0.54)

Overall 82% (102) agreed with the statement with 23% (32) strongly agreeing and 56% (70) agreeing indicating that there is positive agreement that some clinical conditions responded to as '999' emergencies can be potentially managed by paramedics rather than transport to hospital. Although between-group differences did not reach statistical significance there was a trend towards less agreement by A&E consultants where 75% agreed or strongly agreed as compared with GP's (79%), nurses (80%) and paramedics (97%). There was also a trend for greater strength of agreement among the paramedics compared to other groups with 34% strongly agreeing and 62% agreeing. Others were A&E consultants (19% v 56%), GP's (24% v 55%) and nurses (27% v 53%).

Overall there were 5% (6) who disagreed or strongly disagreed with the statement. There was only 1 paramedic who strongly disagreed with 1 A&E consultant who disagreed, 1 GP and 3 nurses. No reason was given by the paramedic as to why they strongly disagreed.

It is possible that these results could have been influenced by different opinions as to what these "instances" may be, as the term was not defined nor were the "strict clinical and non-clinical criteria". This might explain the reported (non-significant) differences between professional groups particularly between paramedics and A&E consultants. Despite the differences between groups the consensus is that there are instances where patients receiving a '999' attendance, have clinical conditions, which can be managed totally by paramedics rather than transfer to A&E departments.

Statement 4

Paramedic diagnostic skills would improve if they worked alongside primary care teams?

(n= 123, p=0.39)

Overall 58% (71) agreed with the statement and 25% (31) strongly agreed. Although between-group differences did not reach statistical significance there was a trend towards less strong agreement by GP's (12%) compared to other groups, A&E consultants (28%), nurses (25%) and paramedics (34%). However the trend was reversed amongst those who agreed with GP's (71%), A&E consultants (56%), nurses (53%) and paramedics (51%).

As with statement 3 these results could have been influenced by differing opinions of what constituted diagnostic skills, as these were not defined. In particular this might explain the reported (non-significant) differences between professional groups particularly between paramedics and GP's. Although subjective one reason could be that A&E consultants are involved in the training of paramedics whereas GP's generally are not involved. The overall strength of agreement between paramedics (86%) and A&E consultants (84%) is similar compared to nurses (78%) and GP's (76%).

Only 1 nurse disagreed with the statement demonstrating, broad agreement.

SECTION TWO

Statement 5

Primary Care Emergency Centres could be one of the main facilities for processing out of hours emergency care and ambulance responses to inappropriate '999' calls?

(n=123, p=0.16)

Overall 49% (60) agreed with the statement and 22% (27) strongly agreed. There was no statistically significant difference between groups however there was a trend towards less agreement by GP's where 52% agreed or strongly agreed as compared with A&E consultants (78%), nurses (80%) and paramedics (60%). There was also a trend for greater strength of agreement among A&E consultants where the percentage strongly agreeing was far higher than GP's and paramedics compared to those who agreed, A&E consultants (34% v 47%), nurses 37% v 43%), GP's (9% v52%) and paramedics (13% v 50%).

As the term "inappropriate 999 calls" was not defined, these results could have been influenced by different interpretations as to what are considered to be inappropriate 999 calls. This might explain the reported (non-significant) differences between the professional groups particularly between GP's and A&E consultants.

An unsolicited letter received from the Local Medical Committee, who arranged for the dissemination of the questionnaires to GP's, expressed their concerns that the development of Primary Care Centres was dependant on sufficient resources and funds being made available. This could explain why overall the percentage of GP's who disagreed or strongly disagreed was higher than other professional groups (18% v 6%), A&E consultants (6%), nurses (13%) and paramedics (20%). The high number of paramedics who disagreed was surprising as the impetus for alternatives to transferring all '999' calls to A&E would arguably benefit staff themselves.

Statement 6

Such centres should be developed to accept referrals by paramedics?

(n=124, p=0.13)

Overall 44% 23% (28) agreed with the statement and 44% (54) strongly agreed. Although between-group differences did not reach statistical significance there was a trend toward less agreement from GP's where 52% agreed or strongly agreed compared with A&E consultants (69%, nurses (73%) and paramedics (72%). This is consistent with statement 5. The percentage of GP's who strongly agreed was low compared with those who agreed (3% v 48%) compared to other groups, A&E consultants (31% v 38%), nurses (33% v 40%) and paramedics (24% v 48%).

There was also a trend for greater strength of disagreement among GP's compared to others with 30% (10) of GP's disagreeing (1 strongly disagreeing) compared to 9% (3) of A&E consultants, nurses 20% (6) and paramedics 14% (4). Overall there appears to be a consensus that primary care centres should be developed to accept paramedic referrals.

Statement 7

There should be a closer working relationship between Primary care and Pre-hospital paramedic care?

(n= 125,p=0.77)

Overall 58% (72) agreed with the statement and 27% (34) strongly agreed. Although there was no statistically significant difference between groups regarding the overall percentage of strength of agreement there was a trend toward GP's who strongly agreed (18%) compared with A&E consultants (28%), nurses (35%) and paramedics (28%).

The overall percentage that strongly disagreed or disagreed was 2% (3) with perhaps of most relevance was 1 paramedic who strongly disagreed although no reason was given. There is a clear message that many agree with the statement that working relationships should be closer between primary and pre-hospital care.

Statement 8

GPs should develop clinical protocols for paramedic interventions to allow them to work more closely with Primary Care Teams, achieving greater care focussed on the community?

(n= 122, p= 0.41)

Overall 50% (61) agreed with the statement and 21% (21) strongly agreed. Although between-group differences did not reach statistical significance there was a trend toward less agreement by A&E consultants where 41% agreed or strongly agreed as compared with GP's (70%), nurses (73%) and paramedics (73%). There was also a trend for greater strength of those who strongly agreed among nurses (30%) compared to A&E consultants (19%), GP's (15%) and paramedics (17%).

These results however could have been influenced by what is understood to be "clinical protocols for paramedics" as the term was not defined. A&E consultants could be said to have a better understanding, as generally this group would be involved in both training and managing paramedic protocols through their involvement in paramedic steering committees. This might explain the reported (non-significant) differences between A&E consultants and GP's. Nevertheless there was broad agreement that GP's should be involved in developing clinical protocols for paramedic interventions.

The numbers overall that expressed their strength of disagreement was low with 6% with 2 each of A&E consultants, GP's and paramedics disagreeing and 1 paramedic strongly disagreeing. No reason was given by the paramedic for their strong disagreement.

Statement 9

The use of integrated Information Technology systems between primary and pre-hospital care should improve communications and would be a desirable objective?

(n= 126, p=0.59)

Overall 53% (67) agreed with the statement and 25% (31) strongly agreed. Although between-group differences did not reach statistical significance there was a trend toward less strong agreement among paramedics where 10% strongly agreed compared to A&E consultants (28%), GP's (24%0 and nurses (35%). Only 2 disagreed, 1 A&E consultant and 1 nurse with no reasons given.

SECTION THREE

Question 10

The use of care pathways represents an effective way of delivering health care?

(n=121, p=0.27)

Overall 60% (72) agreed with the statement and 18% (22) strongly agreed. It was noticeable that although between-group differences did not reach statistical significance there was a trend towards less agreement among paramedics where 59% agreed or strongly agreed as compared with A&E consultants (71%), GP's (79%) and nurses (87%). There was also a trend among nurses who strongly agreed (29%) when compared to A&E consultants (18%), GP's (12%) and paramedics (14%).

Although an explanation was given as to what care pathways are and what can be achieved by utilising them these results could have been influenced by the knowledge, which may already existed among professional groups. This might explain the reported (non-significant) differences between professional groups, particularly between nurses and A&E consultants and paramedics. Although integrated care pathways are beginning to be used in primary care their role is more prominent in secondary care although not necessarily in A&E departments.

Overall 2% (3) disagreed; 1 nurse and 2 paramedics.

Statement 11

It is possible to develop care pathways for the attendance, management and if appropriate subsequent transfer for patients attended to as '999' emergencies by paramedics?

(n=126, p=0.08)

Overall 67% (84) agreed with the statement and 15% (19) strongly agreed. Although between-group differences did not reach statistical significance there was a trend towards less agreement overall among A&E consultants where 53% strongly agreed or agreed as compared to GP's (88%), nurses (94%) and paramedics (77%). Only 2 A&E consultants disagreed with the statement.

These results could have been influenced by differing conceptions as to what the term "management" constitutes as this was not defined. In particular this might explain the reported differences between professional groups particularly between A&E consultants and nurses. Although it could be argued that A&E consultants would be more experienced in determining what patients meet the statement the rationale was to gain a general agreement with the concept, which appears to have been achieved.

Statement 12

Pre-hospital care pathways would increase the workload of General Practitioners?

(n= 126, p=0.47)

Overall 34% (43) agreed with that pre-hospital care pathways would increase the workload of General Practitioners with 9% (11) strongly agreeing. There was statistical significance between-groups with a trend towards less agreement overall by paramedics

where 23% agreed or strongly agreed as compared to A&E consultants (28%), GP's (61%) and nurses (55%). No A&E consultants strongly agreed with 23% agreeing compared to GP's (24% v 36%), nurses (6% v48%) and paramedics (3% v23%).

The percentage overall who disagreed or strongly disagreed with the statement 19% (23) with 6 A&E consultants, 6 GP's 4 nurses and 6 paramedics disagreeing with 1 nurse who strongly disagreed. Perhaps of more importance were those who responded as being uncertain, overall there were 38% (48) with 53% (17) of A&E consultants and 53% of paramedics. GP's were lower with 21% (7) and nurses 19% (8). Although overall 43% expressed some strength of agreement with the statement it is possible make assumptions that there is agreement with the statement that workloads of GP's would increase despite there being no statistical significance in the results.

11% (13) disagreed or strongly disagreed and in line with statement 11, with 32% who were uncertain with paramedics the highest (48%) compared to A&E consultants (40%), GP's (15%) and nurses (29%).

Statement 13

Pre hospital care pathways may increase the workload of primary care teams?

(n= 123, p=0.83)

Overall 50% (62) agreed with the statement and 7% (9) strongly agreed. Although between-groups did not reach statistical significance there was a trend towards less agreement by paramedics where 48% agreed or strongly agreed as compared with A&E consultants (57%), GP's (77%) and nurses (58%).

The only professional groups who strongly agreed were GP's (21%) and nurses (6%) while those who agreed were A&E consultants (58%), GP's (48%), nurses (52%) and paramedics (48%). It is perhaps not surprising when the high percentage of GP's (77%) overall is considered as any increase in primary care workloads could impinge on GP's workloads which is consistent with statement 12. Although the term "workloads" is not defined the results could have been influenced by different perceptions as to how much workloads would increase. This might explain the reported (non-significant) differences between professional groups although the general consensus is that workloads would increase.

SECTION FOUR

The following questions were asked on the assumption that there is agreement for integrated care pathways.

Statement 14

Integrated care pathways combining paramedic and primary care expertise are desirable in today's health service?

(n=124, p=0.65)

Overall 58% (72) agreed with the statement and 19% (24) strongly agreed there was a trend toward less agreement by A&E consultants where 68% agreed or strongly agreed as compared with GP's (76%), nurses (83%) and paramedics (83%). This is despite between-group differences not reaching a statistically significant difference. A low percentage of GP's strongly agreed (3%) compared with A&E consultants (19%), nurses (37%) and paramedics (20%). Among those who agreed the highest percentage was GP's (73%) compared to A&E consultants (48%), nurses (47%) and paramedics (63%). 5% (6) disagreed with none strongly disagreeing.

These results could have been influenced by different interpretations what is "desirable" as the term was not explicit and was intended to be a generalisation, which might explain the reported (non-significant) differences between professional groups. Nevertheless the broad message is that integrated care pathways combining paramedic and primary care expertise are desirable in today's health service.

Traditionally pre hospital care has worked closely with secondary care and should care pathways be developed allowing paramedics to manage patients at home referring them to primary care would mean jointly developed protocols enabling this to happen.

Statement 15

It is possible to develop pre-hospital care pathways for some clinical conditions enabling some patients to remain at home, or to be returned to their home following treatments by paramedics for the following conditions?

Respondents were asked to comment on those conditions selected by the Local Clinical Effectiveness Team (LCET), which are to be developed into draft care pathways. The

conditions identified by the LCET were diabetes, asthma, convulsions and psychiatric patients. The question was a general statement rather than a consideration of clinical criteria, as these would be developed during the development of care pathways.

Each condition was analysed individually rather than collectively. This ensured that each clinical condition was shown, as a more accurate reflection of the health professionals' considerations rather than a skew of any of the data with inappropriate bias.

Diabetes

(n=125, p=0.74)

Overall 63% (79) agreed with the statement and 27% (34) strongly agreeing, indicating a consensus that patients with diabetes are suitable for pre-hospital care pathways. Although there was no statistically significant difference between-groups there was a trend towards less agreement by nurses where 84% agreed or strongly agreed as compared with A&E consultants (90%), GP's (94%) and paramedics (97%). There was also a trend for agreement among the GP's where the percentage who agreed exceed other groups compared to those GP's who strongly agreed (84% v 9%), A&E consultants (63% v 27%), nurses (55% v 29%) and paramedics (52% v 45%). It is possible that although there were high numbers who agreed with the statement they were expressing caution as there were some that offered comments regarding workload and resource implications for both primary care teams and themselves.

Overall 5% disagreed with none strongly disagreeing (3 A&E consultants, 2 nurses and 1 paramedic).

Despite there being a large percent who expressed their strength of agreement the results could have been influenced by different interpretations as to what is meant by "patients remaining at home" as the conditions as to when this would happen were not explained or "following treatments by paramedics" as these were not defined. It is possible that some of the respondents are not aware of what paramedic interventions take place. This might explain the reported (non-significant) differences between professional groups, particularly between nurses and paramedics. However the consensus appears to be high enough to conclude that patients with diabetes fit the

profile of pre-hospital care pathways. This appears to be consistent with results of other studies (Weston 1990, Yaxley 1991, Steel 1992 and Smith 2001).

Asthma

(n= 125,p=0.67)

Overall 34% (43) agreed with the statement and 17% (21) strongly agreed indicating a consensus that patients with asthma could be considered appropriate for pre-hospital care pathways. Although between-group differences did not reach statistical significance there was a trend toward less agreement by A&E consultants where 53% agreed or strongly agreed compared to (GP's), nurses (85%) and paramedics (83%). It was noticeable that there was also a trend towards GP's who agreed compared to those who strongly agreed (73% v 6%), with other groups not some obvious, A&E consultants (38% v 16%), nurses (54% v 31%) and paramedics (63% v 20%).

Overall 9% (11) disagreed with 3% (4) strongly disagreeing. The highest percentage expressing their level of disagreement or strong disagreement were A&E consultants (16%) compared to GP's (15%), nurses (12% and paramedics (7%).

These results could have been influenced by different interpretations of what asthmatic patients may be appropriate for pre-hospital care pathways. In particular this might explain the reported (non-significant) differences between professional groups particularly between GP's and A&E consultants. The percentage of GP's expressing their strength of agreement is consistent with a study by Drummond (1994) who found that the majority of patients who suffer from asthma whose symptoms are mild and moderate receive most of their care from the GP. However conversely Rydman (1999) reported that those patients who revived rapid diagnosis in A&E departments received better treatment, which could explain A&E consultants lower strength of acceptance with the statement. Nevertheless the broad message appears to be that it is possible to develop pre-hospital care pathways for asthma patients.

Convulsions

(n= 122, p=0.86)

Overall 48% (59) agreed with the statement and 19% (23) strongly agreed, indicating a consensus that integrated pre-hospital care pathways could be developed for patients

with convulsions. Although between-group differences did not reach statistical significance there was a trend toward less agreement by paramedics where (60%) agreed or strongly disagreed as compared to A&E consultants (69%), GP's (79%) and nurses (77%). The trend between GP's who agreed compared to those who strongly agreed was again obvious, as was the case with diabetes and asthma (73% v 6%). The difference however was not so obvious in other groups who agreed or strongly agreed A&E consultants (45% v 24%), nurses (33% v 27%) and paramedics (40% v 20%).

Overall 16% (20) disagreed; 6 A&E consultants, 4 GP's, 5 nurses and 5 paramedics with 1 GP and 1 nurse strongly disagreeing.

Consistent with diabetes and asthma it is possible that these results could have been influenced by different interpretations as to what patients with convulsions could fit pre-hospital care pathways, as the statement was a general one without definitions. This might explain the reported (non-significant) differences between professional groups. However there is a consensus, which appears to be consistent with other studies (Stark 1990, Gardner 1990, Sander 1997 and Mechem 2001).

Psychiatric

(n=123, p=0.86)

Overall there was a low strength of agreement with 37% (45) agreeing and 6% (7) strongly agreeing with 27% (33) disagreeing and 7% (8) strongly disagreeing that it is possible to develop pre-hospital care pathways for some clinical conditions enabling some patients to remain at home, or to be returned to their home following treatments by paramedics for psychiatric patients. Although between-group differences did not reach statistical significance there was a trend towards less agreement by paramedics (27%) as compared to A&E consultants (53%), GP's (45%) and nurses ((37%). There was also a trend among paramedics where the percentage that expressed their strength of disagreement exceeded the percentage that agreed or strongly agreed (33% v 27%). This can be compared to A&E consultants (53% v 31%), GP's (45% v30%) and nurses (37% v 33%).

Replies to question 15 suggest a consensus with the concept that certain clinical conditions can be treated and managed in the pre-hospital care environment thereby

reducing the need to transfer patients to A&E departments. However, it is recognised that having clinical approval is only a part of the overall development of care pathways with broader implications such as cultural expectations, training, public education and finance needing to be considered.

Statement 16

The development of care pathways for these conditions could potentially improve clinical effectiveness for these groups of patients?

(n= 126, p=0.61)

Overall 58% (73) agreed with the statement and 18% (23) strongly agreed. Although between-group differences did not reach statistical significance there was a trend toward less agreement by GP's where 70% agreed or strongly agreed as compared with A&E consultants (75%), nurses (81%) and paramedics (80%). There was also a trend among GP's who agreed rather than strongly agreed (64% v 6%) compared to other professional groups A&E consultants (56% v17%), nurses (48% v32%) and paramedics (63% v 17%). 6% (8) disagreed; 1 A&E consultant, 3 GP's, 3 nurses and 1 paramedic with 1 GP strongly disagreeing.

These results could have been influenced by different interpretations as to what is meant by "clinically effective" as the term was not defined. This might explain the reported (non-significant) differences between professional groups particularly between GP's and nurses. Nevertheless there is a consensus that the development of care pathways for these conditions could potentially improve clinical effectiveness for these groups of patients.

Statement 17

Care pathways, initiated by paramedics through '999' attendances would improve out of hospital management for the above conditions?

(n=126, p=0.24)

Overall 56% (71) agreed with the statement and 18% (23) strongly agreed. Although between-groups did not reach statistical significance there was a trend towards less agreement by GP's where 58% agreed or strongly agreed as compared with A&E consultants (72%), nurses (81%) and paramedics (90%). There was also a trend for

greater strength of agreement among paramedics when comparing those who agreed with those who strongly agreed (70% v20%) when compared to other professional groups A&E consultants (56% v 16%), GP's (42% v 15%) and nurses (58% v 23%). 6% (7) disagreed; 4 GP's, 2 nurses and 1 paramedic with none strongly disagreeing.

As the level of improvement was not defined it is possible that the results could have been influenced by differing interpretations as to what constitutes an improvement. In particular this might explain the reported (non-significant) differences between professional groups, particularly between paramedics and GP's. Nevertheless the consensus suggests that care pathways, initiated by paramedics through '999' attendances would improve out of hospital management for diabetes, asthma, convulsions and psychiatric patients.

SECTION FIVE

As stated previously it is recognised that patient acceptance of change is necessary if any new development or change in existing practice is to be accepted. Although patient surveys are outside the remit of this project clinicians were given the opportunity to express their views regarding patient acceptance of care pathways managed by paramedics. The project follows the governments initiative of caring for people at home although it should be remembered that these are patients who have been responded to as '999' emergencies whose expectations may be hospitalisation. The power of the media has arguably influenced people's perspective of paramedics who it is believed are held in high esteem. Whether patients would welcome a change to 'accepted' practice is uncertain and would be wholly subjective at this stage. However it is believed that the following questions give some indication of clinician's views.

Statement 18

Patients would welcome the opportunity to remain at home for specific conditions? (n=122, p=0.27)

Overall 48% (59) agreed with the statement and 30% (37) strongly agreed. Although between-group differences did not reach statistical significance there was a trend toward less agreement by A&E consultants where 55% agreed or strongly agreed as compared to GP's (81%), nurses (82%) and paramedics (97%). There was greater strength of

agreement among the nurses where the percentage strongly agreeing exceeded the percentage agreeing (46% v 36%). This can be compared with A&E consultants (3% v 55%), GP's (25% v 56%) and paramedics (48% v 48%). One GP and 1 nurse disagreed with 1 A&E consultant who strongly disagreed.

Statement 19

It is probable that patients will view alternatives to A&E with suspicion?

(n=124, p=0.70)

Overall 57% (71) agreed with the statement and 6% (8) strongly agreed. Although between-group differences did not reach statistical significance there was a trend toward less agreement by GP's where 50% agreed or strongly agreed as compared to A&E consultants (59%), nurses (57%) and paramedics (73%). There was also a trend for greater strength of disagreement between GP's when compared to those who agreed or strongly agreed (31% v50%). Other groups were A&E consultants (6% v 59%), nurses (17% v 57%) and paramedics (13% v 73%).

It is interesting to note that the number agreeing conflicts with the previous statement where it was agreed that patients would welcome the opportunity to remain at home.

These results could have been influenced by different interpretations as to what the term "alternatives to A&E" mean as this was not defined although it was intended that professionals would assume the term to mean integrated care pathways. This might explain the reported (non-significant) differences between professional groups in particular between GP's and paramedics.

Statement 20

Patients would accept advice from paramedics advising them to remain at home following treatments given within clinical guidelines?

(n= 124, p=0.21)

Overall 43% (53) agreed with the statement with 7% (9) strongly agreeing. 37% (45) did not agree or disagree, with 14% (17) disagreeing or strongly disagreeing. Therefore there appears to be a low consensus with the statement. Although between-group differences did not reach statistical significance there was a trend towards less agreement by A&E consultants where 25% agreed or strongly agreed although the

percentage of those who disagreed or strongly disagreed was low (9%). This can be compared with GP's (50% v 9%), nurses (50% v 27%) and paramedics (77% v 10%).

These results however could have been influenced by different interpretations as to what level of advice would be given by paramedics as this term was not explicit. In particular this might explain the reported (non-significant) differences between professional groups particularly between A&E consultants and paramedics.

Questionnaire conclusions

There appears to be some evidence of support for the development of pre–hospital care pathways providing there are strict clinical and non-clinical guidelines set by clinicians. Respondents were asked to give additional comments regarding benefits and potential risks. Comments ranged from 'excellent project' to disagreement that there would be any real benefit due to insufficient training for paramedics regarding diagnostic skills.

The clinical conditions selected by the Local Clinical Effectiveness Team were met with general agreement with psychiatric conditions receiving the most disagreements. This is consistent with the work of the LCET who were unable to score these groups of patients using the same criteria as the other conditions. Due to the significant number who expressed their disagreement, pre hospital care pathways will not be considered as part of this project as it was felt that this condition could not be managed in the same way as medical emergencies can be managed. It is the view of the LCET that alternatives to A&E should be sought that are consistent with local arrangements such as psychiatric crisis teams.

The majority of comments were centred on medico legal implications and who would be prepared to carry this risk. Clearly there is an issue regarding risk that needs to be explored further, however although an important aspect is not one considered during this hypothesis as this could potentially detract from the theory of the development of pre-hospital care pathways. However it is recognised that this issue would need to be fully evaluated before potential trials could be undertaken.

A further concern was the implications for funding with primary clinicians concerned that new alternatives would potentially increase workloads without additional

resourcing. Of a lesser concern was secondary care professionals safeguarding income with potential disinvestment to primary care should patients not be transferred to A&E departments.

There appeared to be general agreement that patients would welcome the opportunity to remain at home but clinicians were generally uncertain as to whether patients would accept the advice from paramedics.

These results must be viewed with caution as their showing of no differences in attitudes between professionals may be due to the small number, which did not allow for any trends to reach statistical significance.

Although respondents in the pilot study had reported, "questions were both concise and easy to answer" it became evident when examining the responses to the main survey that a degree of ambiguity might have been present in many cases. Moreover, it was realised that the background information in each section, which preceded the specific statements, could have influenced the responses to those statements. For example, although the intention was to elicit respondents' own views, those who disagreed with a particular statement might have been discouraged from saying so when the background section highlighted the evidence, which supported the statement.

The ambiguity, which remained in many statements, was of various types. First, as explained on p: 107, imprecise terms such as 'large' or 'inappropriate' could clearly mean different things to different people and should have been avoided. More precise terms would have reduced any concerns over validity.

Second, although intended to convey a single thought, a number of statements could have been regarded by respondents as 'two-part' statements, which could make the provision of a single response difficult. For example the front end of statement 2 refers to the general improving of paramedic diagnostic skills - something few would disagree with - while the back end refers to paramedics making judgements regarding where to transfer patients - a far more contentious issue. Respondents did not have the opportunity to disentangle these two elements, which would be necessary if their degree of agreement differed between the different parts of any statement. Moreover, although it was never intended, some statements included elements, which might raise accusations of intentional directing of

respondents. For example, in statement 8 respondents' views on the role of GPs in developing paramedic protocols could have been influenced by the unnecessary rider "achieving greater care focused on the community".

Third, greater effort could have been made to distinguish statements of capability ('could be') from statements of desirability ('should be'). Any lack of appreciation by respondents of this distinction could raises concerns over validity.

Finally, ambiguity might have unintentionally been placed in some of the statements simply because of their length. For example statement 15 is 34 words long, refers to some clinical conditions, to some patients, and to patients both remaining at home and returning to their home following treatment by paramedics. Shorter and more precise statement would have reduced ambiguity.

6.6 Developing a protocol suitable for inclusion in Pre-hospital Care Pathways

The second phase of the workshop was to consider the development of a pre-hospital care protocol that could become part of an integrated care pathway. On the basis of the agreement reached by clinicians through the questionnaire a protocol has been developed that could be suitable for inclusion in a pre-hospital care pathway for those patients who have contacted the ambulance service through the '999' emergency system. Although clinicians at the workshop selected three clinical conditions, asthma, diabetes and convulsions suitable for development only, diabetes has been chosen for protocol development.

Integrated care pathways use multi disciplinary guidelines or in the case of paramedic's protocols, to develop and implement clinical plans, which represents current, local best practice for specific conditions. They may also incorporate national guidelines; evidence-based medicine and benchmarking (Rosenberg 1995) these issues have been considered when developing the following diabetes protocols which commence from the time that a '999' call is received.

Other factors have been considered where guidelines or protocols do not currently exist such as decisions as to where the patient would be most appropriately managed are within strict clinical and non-clinical criteria. All episodes of first event and children under 16 will be taken to A&E departments to minimise clinical risk, with the emphasis

on blood glucose level, consciousness level and general well being. History taking plays a significant part with the assumption that the majority of patients understand their own condition. The non-clinical factors were based on those non-clinical indicators of the ten considered by the Local Clinical Effectiveness Team. The protocols have been structured to take account of the dispatch criteria, pre-arrival advice, on scene protocols and a clinical and non-clinical criteria that enables the paramedic to make a decision as to whether the patient needs to be referred to A&E or can be managed alternatively.

Review criteria were developed, which allows evaluation through Donabedians framework of structure, process and outcome. Donabedian proposed that three aspects of health care are amenable to evaluation; structure, process and outcome. Structure referring to the resources, facilities and organisational settings, process to the set of activities which go on between practitioners and patients and outcome, the change in a patients' current and future health status which can be attributed to the health care they have received (Donabedian 1980). For the purposes of this criteria setting structure has been substituted for standard on the basis that achievement that the standard would be dependent on the structure and resources available.

The review criteria are in three stages

- **Standard** – These consider the % of patients responded to, who actually required a Category A response. The % that were attended within 8 minutes. These reflect those organisational arrangements for ensuring there are sufficient resources to meet the demands on the service or where resources are being used efficiently.
- **Process** –. These are the treatment processes concerned with delivering patient care. The % that receive pre arrival advice and the % that meets the non-clinical criteria and the % that were referred to primary care.
- **Outcomes** –These vary depending on the clinical condition of the patient and audit the % of patients within each condition who have improved once drug regimes or other therapies have been administered in addition to those who have been responded to within the prescribed response standard. Outcomes are based on the end point of the integrated care pathway, which enables an assessment of the patient's clinical outcomes to be made through the mechanism of clinical audit. They also allow for an audit to be undertaken for the % of patients who refused transfer,

6.7 Diabetes protocol

The development of a pre-hospital care protocol for diabetes has been selected due to the significant numbers of patients who suffer from this condition. In addition the debate surrounding this condition suggests that there are alternatives to automatic transfer to accident and emergency centres for certain categories of diabetics.

Around 2% of the population is known to have diabetes, 75% of these have non-insulin diabetes mellitus (type 2) with 25% having insulin dependent diabetes mellitus (type 2). More women than men are affected. The likelihood of under-diagnosis of type 2 is possibly as high as 2%, and even higher within certain ethnic sub-groups. The prevalence of diabetes increases with age with more than 6% of people aged 65 having diabetes. Diabetes is an increasingly common, chronic condition that affects many systems and carries with it a high risk of serious morbidity and premature mortality. The disorder itself and particularly its management have a profound impact on people's everyday lives and overall use of healthcare resources (Williams 1994).

Although the care of diabetes is believed to rest mainly with primary care specialists the concept of sharing the care for people with diabetes between hospital and general practice has been around for some time, with follow up remaining largely the preserve of specialists until the 1970's. Since then various factors appear to have contributed to the increased involvement of general practice in diabetes care. These include the rising prevalence of diabetes, overcrowding in hospital clinics, better training for primary care doctors and nurses, easier access for patients in primary care and trends in governmental policy (Greenhalgh 1994, Griffin 1997). However, there remains wide international variation in the extent of this involvement as well as the degree to which it is based on evidence of effectiveness. The involvement of generalists at some level seems unavoidable. What remains less clear is how they can be enabled to make a cost-effective contribution, what the precise nature of that contribution should be and how secondary and tertiary services (potentially including ambulance paramedics) can best support generalists in providing it (Griffin 1997).

The Health Service Accreditation document '*Standards of Patient Care*' has identified the following diabetic patients who are suitable for sole responsibility of the primary care team without referral to secondary care: -

- Treated by diet alone
- Treated by diet and tablets
- Insulin-treated who are well-controlled

Primary care treatment and management of diabetic patients would be initiated based on these factors with full access to patient records. Paramedics responding on '999' emergency calls to diabetics do not always have this history or information when attempting to diagnose a patient's condition. This only serves to emphasis the need for a multidisciplinary approach to the treatment and management of pre-hospital diabetic patients.

6.8 Pre-Hospital and Emergency Treatment of Hypoglycaemic Patient

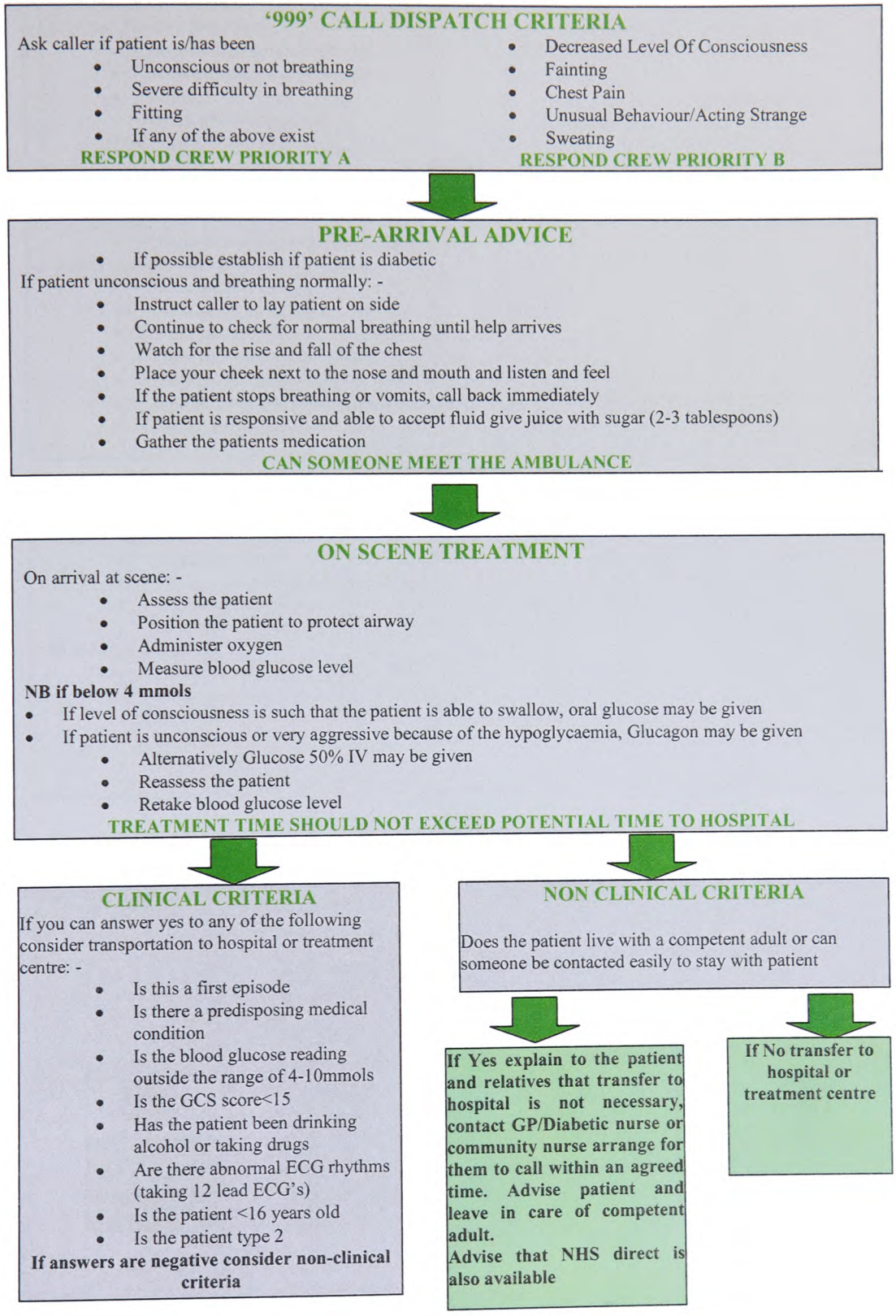
One of the most comprehensive literature searches to be undertaken on diabetes is that conducted by Smith (2001) who found that Diabetic hypoglycaemia has been researched quite extensively using many methods, but there seems to be a shortage of research into the pre-hospital treatment of the illness although it is a frequently seen and treated symptom of a known and understood illness that can be, and is, treated at the scene.

A study undertaken by Smith (2001) found that while some research has been undertaken regarding the role of the paramedic in the treatment of hypoglycaemia, it seems to be concentrated in the area of dosages of dextrose, glucose and glucagon, and the debates and arguments that surround them. There seems to be much less research, however, that deals with the area of pre-hospital treatment in general: the role of the ambulance crew, the public response towards the emergency services, the provision of services for diabetic patients, and, most importantly, the emergency treatment of hypoglycaemia and the results; numbers of patients transported to a hospital, numbers of patients refusing transportation, numbers of patients responding positively to the services that the ambulance crew provides in these cases (Smith 2001).

The following protocols have been designed for those '999' diabetic patients (type 1) who could potentially be referred to primary care and for those who can be left at home. Patients who are type 2 who do become hypoglycaemic should be transported to

hospital for further investigation. The protocols have reflected best practice and have built on the professional advice given by clinicians of the Local Clinical Effectiveness Team.

'999' Diabetes Care protocol patients referred to Primary care



'999' Diabetes Care protocol patients left at home

'999' CALL DISPATCH CRITERIA

Ask caller if patient is/has been

- Unconscious or not breathing
- Severe difficulty in breathing
- Fitting
- If any of the above exist

RESPOND CREW PRIORITY A

- Decreased Level Of Consciousness
- Fainting
- Chest Pain
- Unusual Behaviour/Acting Strange
- Sweating

RESPOND CREW PRIORITY B

PRE-ARRIVAL ADVICE

- If possible establish if patient is diabetic

If patient unconscious and breathing normally: -

- Instruct caller to lay patient on side
- Continue to check for normal breathing until help arrives
- Watch for the rise and fall of the chest
- Place your cheek next to the nose and mouth and listen and feel
- If the patient stops breathing or vomits, call back immediately
- If patient is responsive and able to accept fluid give juice with sugar (2-3 tablespoons)
- Gather the patients medication

CAN SOMEONE MEET THE AMBULANCE

ON SCENE TREATMENT

On arrival at scene: -

- Assess the patient
- Position the patient to protect airway
- Administer oxygen
- Measure blood glucose level

NB if below 4 mmols

- If level of consciousness is such that the patient is able to swallow, oral glucose may be given
- If patient is unconscious or very aggressive because of the hypoglycaemia, Glucagon may be given
  - Alternatively Glucose 50% IV may be given
  - Reassess the patient
  - Retake blood glucose level

TREATMENT TIME SHOULD NOT EXCEED POTENTIAL TIME TO HOSPITAL

CLINICAL CRITERIA

If you can answer yes to any of the following consider transportation to hospital or treatment centre: -

- Is this a first episode
- Is there a predisposing medical condition
- Is the blood glucose reading outside the range of 4-10mmols
- Is the GCS score<15 and the patient type 2
- Has the patient been drinking alcohol or taking drugs
- Are there abnormal ECG rhythms (taking 12 lead ECG's)
- Is the patient <16 years old

If answers are negative consider non-clinical criteria

Does the patient live with a competent adult

Are there relatives available to stay with the patient

Are there means of communication on/within the premises?

Is the environment safe?

If the above answers are yes, explain to the patient and relatives that transfer to hospital is not necessary, write a letter for the GP and leave the patient in the care of a competent adult.

Advise the patient that NHS Direct can answer any further queries they may have

REVIEW CRITERIA FOR THE TREATMENT OF ADULTS WITH HYPOGLYCAEMIA IN PRE-HOSPITAL CARE

The review criteria are set out in a format to reflect level of advice, dispatch, and treatment protocols, using a similar process as to how clinical guidelines address these issues. Patients can be excluded from the protocol any stage due to non-compliance. The criteria should reflect specific groups of patients with similar levels of illness severity.

Structure	For those patients who require emergency response	**The % who require Category A**
	For those patients who are unconscious	**The % who require pre-arrival advice**
	For those who required Cat A response	**The % who should be attended within 8 minutes**
Process	For those patients who require glucose/glucagon	**The % whose BM <4mmols**
	For those patients whose BM<4mmols	**The % whose GCS<15**
	For those patients who received glucose/glucagon	**The % whose BM Improved**
	For those patients who improved	**The % whose GCS improved to 15**
Outcome	For those patients who were not transferred	**The % who refused transfer**
	For those who meet the clinical criteria	**The % who meet the non-clinical criteria**
	For those who should have received an 8 minute response	**The % who received an 8 minute response**
	For those who meet both criteria	**The % who were referred to primary care**

6.9 Clinicians comments

All the clinicians felt that the concept of integrated pre-hospital care pathways with enhanced paramedic protocols were appropriate provided the other contextual factors were taken into account. It was felt that pathways were likely to improve patient safety and increase public confidence provided they were informed of the availability of the service and more importantly knew how to access it. A more definite diagnosis was implicit otherwise it was believed the risk might be too great in leaving patients who should receive either hospital care or a GP visit for conformation.

The consensus was that accessibility depended on geography and setting i.e. where the episode occurred. Consideration needs to be given as to whether the patient is at home and indeed whether the local health care team may in fact be nearer than the paramedic. Provided that the contextual factors are taken into account the clinicians felt that the pathways could be clinically effective although there may be an element of risk. However this may be significantly reduced if it was determined whether the patient was currently under hospital or GP care. There was a view that more complex judgement may be required than currently exists amongst paramedics but given the development of Practitioners in Emergency Care this may be sufficient for these judgements to be made.

On the whole the protocols were seen as being acceptable as part of integrated care pathways although it was believed that there would continue to be an element of patients excepting to be treated at hospitals. It was however, believed that the protocols would be a more efficient use of resources as well as being safer than current service provision due to the link between paramedics and other health professionals.

Generally it was felt that the protocols as part of integrated care pathways would be provide a more equitable service and more importantly would provide a national standard or care with one clinician commenting that the current service delivery "is something of a lottery".

6.10 Results summary

The results indicate that there is support from health professionals regarding the concept of pre-hospital integrated care pathways albeit with some reservations. These in the main are clinical risk, medico legal and resource implications as well as a potential increase in primary care workloads. Clinical risk and the medico-legal implications are outside the remit of this study as is debating the argument as to whether primary care workloads would increase.

There is significant agreement that the introduction of pre-hospital integrated care pathways represents an effective alternative to delivering health care whilst potentially being a more efficient use of resources. Although there was general agreement that the workload of primary care teams would increase this needs to be balanced against the

number of 'inappropriate' attendances at A&E departments and whilst not reducing demands overall there would potentially be a reduction of these A&E attendances.

There appeared to be overwhelming support that there are certain clinical conditions attended by paramedics as '999' emergencies that can be effectively managed outside of A&E departments albeit with an element of clinical risk.

Should pre-hospital care integrated care pathways be considered a viable alternative to current service delivery there are clearly resource implications mainly to primary care but also to the ambulance service and hospitals. The next chapter considers these resource implications in a number of circumstances i.e. by following the integrated care pathways for a specific condition how many would remain in primary care that are currently transferred to hospital and how many would still require transportation.

CHAPTER SEVEN

7. RESOURCE IMPLICATIONS

The general practitioner contract of 1990 introduced financial incentives for GPs to replace some hospital-based services with GP practice based provision. This move from secondary to primary care was re-enforced by a major initiative from the Department of Health (DoH, 1995) which had an explicitly stated aim to create a primary care led NHS. Since then, numerous changes including the setting up of Primary Care Trusts in England and Local Health Boards in Wales have further enhanced the role of general practitioners. Together, these are having far reaching effects on primary care workloads (Pederson, 1997).

GPs are thus taking on a greatly extended role which in some areas is also including chronic disease management including diabetes and asthma as part of their contracted arrangements. Diabetes and asthma are two of the clinical conditions, which the Local Clinical Governance Group agreed at the workshop stage of this study, were amenable to pre-hospital protocols. One effect of these protocols would be that some asthma and diabetic emergency cases, which would otherwise be transported to A&E departments, could, given the right circumstances, now be taken to their general practitioner instead. Given that this study has identified concerns among those in primary care about this potential increase in workload it is important to try to quantify the magnitude of this effect.

At the same time as potentially increasing GP workload, the introduction of pre-hospital integrated care pathways can also involve a release of accident and emergency resources. Moreover, there is evidence that many patients brought to an accident and emergency department end up being inappropriately admitted as in-patients especially in the evening and overnight when the departments are likely to be staffed by junior doctors (Blandford 1997). A study by Victor (1994) found that up to 20% of such hospital admissions might be inappropriate. This is consistent with other studies (Billittier 1996, Coast 1996 and Hensher 1999) and may be explained by junior doctors in A&E departments practising defensively and lacking confidence to resist an admission (Capwell 1996, Blatchford, 1997). The secondary care resource implications of pre-hospital integrated care pathways are thus likely to extend beyond the A&E department.

Estimating the resource implications of pre-hospital integrated care pathways could involve either comparing resource use before and after their introduction, or comparing resource use in an area using pathways with a control area without. This was clearly beyond the scope of the present study. Instead, a crude estimation of to illustrate the resource effects of introducing pathways was undertaken by auditing data on patients taken to several A&E departments in April 2002. Although there was agreement that asthma, diabetes and convulsions are all appropriate clinical conditions for management by integrated pre-hospital care pathways only diabetic patients were chosen. This was partly because in the case of diabetes there is literature available, which can allow comparisons to be made of improvements after treatment by paramedics. In the case of convulsions, on the other hand, it was believed that the majority of patients normally recover prior to the arrival of the ambulance and without paramedic interventions. Diabetes was also chosen because patient numbers were likely to be higher when compared to asthma.

7.1 Retrospective audit of diabetes patients

7.1 .1 Method

Data to be analysed for this audit was retrospectively collected from the Patient Clinical Records (PCR) from the Welsh Ambulance Services NHS Trust's central access database for the period 1/4/2002 to 30/4/2002. The Patient Clinical Record captures the clinical interventions undertaken by the paramedic on scene and only records what has happened pre-hospital (Appendix 4). At the A&E department the record is given to the doctor who discusses the case with the paramedic and keeps the record as part of the patient's clinical record initiated at the hospital. It does not continue to record any more treatments on the ambulance services PCR. The PCR is then sent to a central clinical audit department where the records are scanned enabling audit data to be produced.

PCR's for all patients whose Blood Glucose reading was less than 4mmols/litre were requested for the month of April throughout Wales. It was intended then to select all diabetic patients who had been treated by a paramedic to evaluate how many would have potentially met the pre-hospital integrated care pathway criteria. However due to technical difficulties only 130 records could be identified although it is known that the actual number is larger. There is, however no reason to suspect that the 130 records are not representative of all records.

Since PCR does not record what has happened to the patient in the A&E department, it might have been possible to examine medical records in order to determine whether the patient had been discharged with no further treatment, was treated in the A&E department or had been admitted to a hospital ward. This however would have required informed consent (as well as approval from the local research ethics committees) and, given the main aims of the thesis was considered to be beyond its scope. A total of 130 PCR's were found for patients with an initial BM of less than 4 mmols/l. No consideration was given with regard to geography and the patients selected represented both rural and urban areas with differing journey times to the nearest A&E department.

The audit attempted to identify patients who: -

a) refused transport and wished to remain either at home or their place of work.
b) were delivered to hospital but received no further treatment in the A&E department or received treatment that could equally have been given the primary care setting.
c) had an underlying clinical condition which made their admission to hospital appropriate

An expert panel consisting of three Senior Clinical Operations Officers was set up to review the 130 patient clinical records for April 2002. These officers were all experienced; all had training and a clinical operational background and were concerned in the clinical governance process of the Trust as well as being involved in developing clinical effectiveness processes. All three were qualified or were studying for qualifications; one had a Masters in Public Health, another was undertaking a Masters degree in Clinical Effectiveness with the third had just completed a first Degree in Pre-hospital care.

The panel were asked to review the records and based on the clinical criteria of the diabetes pathway were asked to select those patients whose clinical condition met the following criteria: -

- was this a first episode?
- was there a predisposing medical condition?
- was the blood glucose reading outside the range of 4-10 mmols/l ?
- was the GCS score<15?
- had the patient been drinking alcohol or taking drugs?
- were there abnormal ECG rhythms (taking 12 lead ECG's)?

Once these patients were selected they were then either included in the exercise or excluded depending on whether they had improved after paramedic intervention. For example it is probable that all patients with a first episode would be excluded, as these would be likely to need further medical examination. Should there be a predisposing medical condition then this would mean transfer to hospital although it is possible that the condition may not warrant transfer. However the integrated pre-hospital care pathways err on the side of caution and aim to reduce any potential clinical risk to a minimum. The CGS below 15 could be improved subject to paramedic intervention of glucose or glucagon drug therapy should this be the case then there may be good reason for not transferring. Alcohol and drug taking are normally appropriate factors for transfer to hospital as they could potentially mask other signs of neurological disorder. However if a patient becomes lucid and aware of what has happened, it may be that alcohol or drugs have caused the hypoglycaemic attack in which case transfer to hospital might not be required. ECG rhythms, which may be abnormal to the paramedic, may be normal for the patient who may be taking drugs to regulate an underlying non-associated clinical condition, which will become evident through history taking.

As well as clinical criteria, non-clinical criteria were applied which were dependent on the patient having a competent adult and means of communication and a safe environment.

The following are examples of the 130 patients whose BM was below 4mmols/l and were attended by paramedics during the study period.

A female patient aged 27 with Insulin-dependent Diabetes Mellitus (type 1) had missed her breakfast and subsequently became hypoglycaemic. The ambulance was called at 11:11 and arrived on scene at 11:14. The patient's mother had attempted to give milk and biscuits and the patient had improved slightly. The patient was administered glucose with a further dose 10 minutes later and the patient's GCS improved to 15. The journey time to hospital in this particular case was 45 minutes with a distance of 29 miles (calculated using AutoRoute express). The total potential saving from use of

integrated pathways would have been 58 miles travelled with over 90 minutes potential emergency cover lost.

A male patient aged 69 with IDDM was attended at 13:15 and found to be in a collapsed condition. His GCS was 14, pulse 112 beats/minute, respiration 20 breaths/minutes and Blood Pressure (BP) of 170/70mmHg. The patient was administered drug therapy and did not improve; in fact his condition worsened. In this case it was appropriate for the patient to be transferred to the A&E department for further treatment i.e. the use of the pathways would not have had any effect on resource use in this example.

Paramedics attended a 79-year-old male at 04:14 who was IDDM and had a GCS of 15. The patient was not treated and did not have any underlying medical condition. The patient appeared lucid throughout and was transferred to hospital. Although in this case the mileage incurred was only 14 miles (return) the crew were unavailable for 30 minutes in a very busy city area. In this particular case it was known that the patient was admitted 'as a precaution' by the junior doctor on duty.

A male patient aged 50 whose BM was below 4 mmols/l was attended at 13:29. Vital signs were, pulse 70, BP of 176/130mmHg, respiration 20 breaths per minute and GCS of 13. Following drug therapy his GCS improved to 15. However the patient had an underlying medical condition having suffered a Myocardial Infarction approximately two years previously. Despite this patient having improved and there being a competent adult available to care for him it was appropriate that he be transferred to hospital for further treatment. Again the use of pathways would have had no effect on resource use in this example.

7.1.2 Audit results

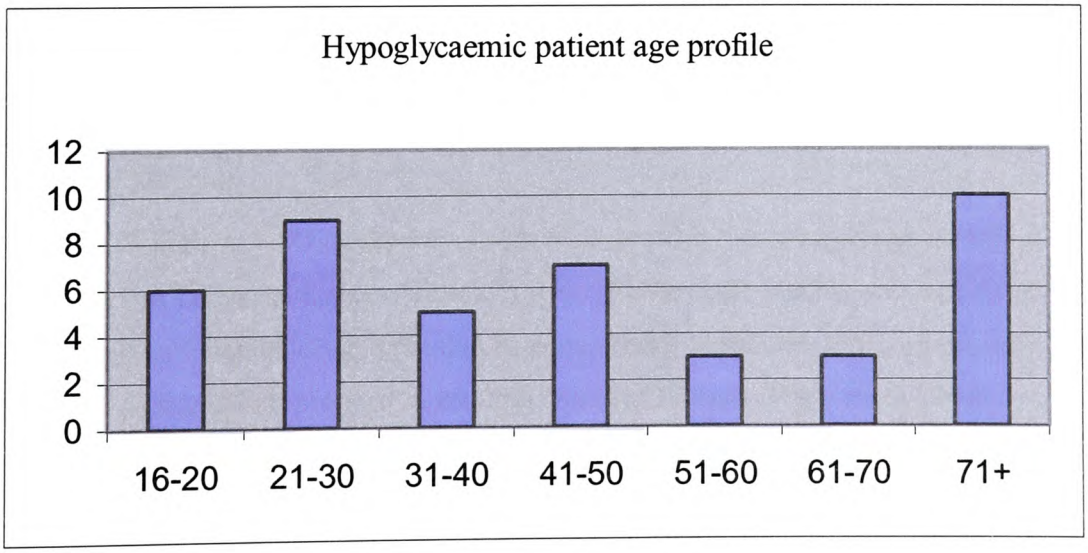
Of the 130 PCR's audited 3 were under age and were excluded and a further 29 records were disregarded as the data was insufficient for the above questions to be answered. Of the 98 remaining, 23 refused to be brought to hospital. Of these, 16 recovered with a GCS of 15 following treatment by paramedics and 7 had recovered before the arrival of the ambulance crew and had an initial GCS of 15 when first examined by the paramedic. These findings are consistent with other studies (Weston 1990, Yaxley 1991 and Steel 1992).

Of the remaining 75 patients, 32 had an underlying medical condition, which meant transfer to hospital for assessment was considered appropriate. These conditions included previous heart attacks, pregnancy with stomach pains, breathing difficulties and unresponsive patients following treatment.

This left 43 patients whose GCS had improved following treatment by paramedics and who, if the pre-hospital integrated care pathways were in operation, would in all likelihood not have been delivered to hospital. Estimates were thus made on the effect of the pathways on the NHS resource use associated with these 43 patients.

Figure 1 below shows the age profile of all 43 patients who's GCS had improved following pre-hospital care treatment. Twenty of these were aged under 40, which are consistent with studies, by Pennycook (1991) and Billittier (1996). Ten patients were aged 70 and over.

Ten of these patients admitted that their hypoglycaemic attack was due to having drunk large amounts of alcohol or having avoided eating and as they had no underlying medical condition the possibility that the influence of drink and drugs were masking other symptoms could potentially be excluded



Of the 43 diabetic patients who met the pathway criteria but were brought to A&E departments because the pathways were not in place approximately 30% (13) would

have been admitted to a hospital ward and 60% (26) discharged with no further treatment. These figures are based on the proportions of hypoglaecemic patients seen in A&E departments and discharged with no further treatment in studies by Steele (1992) (60%) and Wolford (1996) (66%) Weston (1990) found in his study that 30% were admitted. These represent some of the largest studies undertaken on diabetic patients in pre-hospital care. No study made any reference to whether those patients who were admitted were done so inappropriately by junior doctors. However given that junior doctors tend to discharge patients cautiously, it is possible that more patients might be discharged that are currently admitted.

7.2 Resource implications to GP's and primary care.

The pre-hospital integrated care pathways for diabetes suggest two paths; one is to contact the GP or primary care nurse and arrange for them to visit, the other is to leave the patient with a letter for the GP with instructions for the patient to contact the GP at their convenience or when appropriate. The second path is likely to have less of an immediate impact on GP resources especially as it is more likely to include a home visit.

Estimating the effect of the introduction of pre-hospital integrated care pathways on GP resources is complicated by the fact that in the absence of pathways, many of those brought to A&E departments and discharged without further treatment would have been contacting their GP anyway. By the estimates above, 26 of 43 patients were discharged without further treatment and it is likely some proportion of these would have contacted their GP soon after discharge although it is unknown what this proportion might be.

If it were as high as 100%, then the introduction of pathways would have no effect on the *number* of GP consultations, although it could affect the number of contacts made out-of-hours and potentially the number of home visits. Moreover, for those admitted as in-patients, a significant proportion would be referred to their GP by the hospital.

The overall impact of the introduction on integrated pre-hospital care pathways on GP resources would thus appear to be small. This is consistent with the report of a review of the literature which found little evidence that a shift of services from secondary care to primary care was actually responsible for GP's increased workloads and that GP's

had little more than anecdotal evidence to support their claims of greatly increased workloads (Pederson, 1997).

Furthermore, in the case of diabetes, several studies (Weston 1990, Yaxley 1991, Steel 1992, Socransky 1998 and Billittier 1998) have suggested that it would be safe to leave patients without referral to GP's or any other health professional. Should this be the case then this re-enforces the argument that there would be little impact on GP's or primary care groups. However there are issues such as clinical governance and medico-legal implications that will not make this a straightforward process. In addition although there is evidence to support that other conditions such as convulsions (Abardanell 1993, Jacoda 1997 and Mechem 2001) could be treated by paramedics and left at home it is clear that there may be clinical conditions that require the attendance or referral to the GP or primary care team. There would undoubtedly be resource implications for these clinical conditions should they occur during surgery hours. This strengthens the need for jointly developed protocols involving all appropriate parties.

7.3 Implications to the ambulance service

The introduction of pre-hospital integrated care pathways can also produce resource benefits to the ambulance service since ambulances can return to base sooner if they do not have to transport every 999 patient to an A&E department. Resources are thus released which can be used to respond to other calls or at least be available to respond. In addition there may be reduction in costs, as ambulances will not be undertaking unnecessary mileage transferring patients 'inappropriately' to A&E departments.

To get a crude estimate of the potential benefits to the ambulance service the audit undertaken for the diabetes patients found that each return journey took on average 1 hour 12 minutes with a return journey of 42 miles. When applied to the 43 patients who could have remained at home and were 'inappropriately' transferred to A&E there was a possible saving of 48 hours travelling time, which could have been utilised as emergency cover and just over 1800 miles. The savings from reduced journey time/travel is made up of the opportunity cost of the ambulance crew's time and the money cost of the journey. If an ambulance crew is not available to attend another emergency call because they are making an unnecessary journey to hospital, then the opportunity cost can mean life lost.

It must be remembered that ambulances operate from ambulance bases, which are generally away from DGH's and in areas such as Powys where there are no DGH's, the journey times and mileage's can be significant. It is probable that an ambulance travels to the patient and then has a further journey to the hospital. The journey time calculated for the purposes of this study is the saved journey of transferring the patient to hospital. Should the ambulance return to base then this clearly is not a saving and has not been calculated. The concept of pre-hospital integrated care pathways may thus have a greater impact in rural areas, although this should not preclude their development in urban areas.

When the standard formula for calculating mileage cost is applied (fuel costs plus maintenance and in the case of the Welsh Ambulance Services NHS Trust lease costs) the cost per mile equates to 40 pence. On this basis the potential saving for the 43 patients is over £700. The total number of emergency calls received by the Welsh Ambulance Service NHS Trust was 191,000 during 2000/2001 with approx. 3,200 being emergency calls for diabetics. If the potential savings are applied to the approximately 44% who could be managed through the pre-hospital integrated care pathway process then the potential savings could be as high as 1700 hours saved with a cost saving of approximately £30,000 per annum.

7.4 Chapter summary

Clearly further research using more rigorous methods is required to assess the true extent of implications for introducing pre-hospital integrated care pathways. Nevertheless, the preceding analysis at least suggests the following two hypotheses: -

1) The introduction of more robust protocols as part of pre-hospital integrated care pathways will release potential cost savings to the ambulance trust that would enable re-investment into patient care the opportunity for ambulance crews to be released to provide emergency cover is probably more significant. If the equation of time applied to the number of diabetic calls is equally applied to other clinical conditions which can be managed by pre-hospital integrated care pathways then potentially a significant number of hours could be more usefully utilised, together with increased cost savings.

2) The concept of integrated pre-hospital care pathways could then become clinically effective not only for the patient attended with diabetes, asthma or convulsions in that the treatment and management of these clinical cases are as effective as hospital care but also for those patients who are dependent on a rapid response by paramedics. Time lost through a delayed response for life threatening conditions can be critical and it is suggested that time can be made available through the concept of integrated pre-hospital care pathways.

The implications of pre-hospital integrated care pathways to primary care and GP's would appear to be minimal in that patients would be asked to contact their GP by the attending paramedic when convenient. This would only be after treatment and if the patient meets the clinical and non-clinical criteria of the pathways. In addition it is likely that those patients treated and discharged from A&E would be referred to their GP and most definitely in the cases of those patients admitted.

CHAPTER EIGHT

8. CONCLUSIONS

The aim of this study was to consider whether pre-hospital care pathways can improve the clinical effectiveness of emergency ambulance managed care. To achieve the overall aim, the following objectives needed to be met:

1. **An overview of what is currently known about integrated care pathways and more generally on evidence of how changes to ambulance services can improve clinical outcomes.**

It is clear that the ambulance service has grown in stature in recent years and despite there being some arguments against some paramedic interventions, such as those in trauma care, there appears to be an overriding consensus that paramedic interventions do contribute to improved clinical outcomes. However there may be a need to review ambulance service structures enabling more emphasis to be placed on clinical issues rather than the traditional operational focus concentrating on response standards. This may prove difficult in that changing the way that an ambulance service works is a different challenge from achieving change in other NHS organisations. Front-line staff are scattered over large geographical areas away from headquarters and in most cases working without direct supervision.

A review of various reports produced by the Commission for Health Improvement's assessments of ambulance services since 2002 shows that more and more services are employing a medical director as part of the trust board. This will strengthen the clinical development of ambulance services and will enhance progress towards national clinical guidelines.

Currently ambulance services do have Paramedic Steering Committees (PSC), which advise on paramedic training and provide a monitoring role on paramedic development. However these relationships are informal as the PSC are not employed or paid by ambulance services and although are a valuable asset generally cannot be relied on to influence the clinical agenda for ambulance services. Clearly ambulance services need

to consider the Commission for Health Improvement report (2003) that recommends trusts ensure there is clear and effective clinical leadership and that all staff are working to up to date, evidence based clinical guidelines.

2. Consider how conducive recent changes to the National Health Service are to the introduction of pre-hospital integrated care pathways.

There is little doubt that the NHS could make good use of more money. Less clear is the best way of spending that money. Government policies have focused on principles such as stewardship of resources, the need for more clinically effective services and the need for more integrated working between clinical professionals that also involves patients and their carers. However, despite the Chief Medical Officers report in 1997 identifying the need for the various emergency health services to be considered together as a whole system, what is lacking is a cohesive policy that recognises the skills of paramedics focusing on their contribution to improved clinical outcomes. This would enable the emphasis to be shifted the away from responses standards to the evaluation of a holistic approach to the contributors to clinical outcomes of those patients who originate as '999' emergencies. Although reports have been commissioned (Audit Commission, 1998, Nicholl, 2000) no definitive government policies have been developed other than the introduction of revised response standards based on severity of clinical condition. Whilst this may be perceived as being a significant shift away from response standards alone the emphasis is still on speed of response. There is no explicit requirement on ambulance services to monitor the clinical outcome of patients for those life threatening conditions responded as category A with the choice being left to respective services should they wish to develop relationships with local A&E departments.

The development of NHS Direct clearly has the potential for reducing those '999' calls that are of low priority although it is recognised that the reverse could be the case in that more calls could be diverted from NHS Direct to the ambulance service. This is an accepted risk when patients are given more choices however despite whether there is an impact on the service all patients will continue to be transferred to hospital. The principles of government policies seem suited to the introduction of pre-hospital integrated care pathways in that through the concept of pathways there must be collaborative working among all health professionals. The study questionnaire indicates

that resources would be used more effectively, which is another policy principle with another being that the patient will be treated and managed more appropriately in the community.

3. **Assess clinical opinion as to whether the principle of pre-hospital integrated care pathways is an acceptable alternative to automatic delivery to accident and emergency departments.**

The study showed that there was strong agreement among all health professionals surveyed that the introduction of pre-hospital integrated care pathways would represent an effective alternative to delivering health care whilst potentially being a more efficient use of resources. Although there was general agreement that the workload of primary care teams would increase this needs to be balanced against the number of 'inappropriate' attendances at A&E departments and whilst not reducing demands overall there would potentially be a reduction of these A&E attendances. There were however some reservations amongst GP's regarding issues such as medico-legal implications, clinical risk and more significantly resource implications.

There is some indication that some General Practitioners may have concerns regarding developments that could potentially impinge on their professional autonomy. Although this dilemma would appear to be a general problem, more research is required as those GP's who were involved at the workshop stage clearly were enthusiastic towards pre-hospital care development. While the concerns of respondents could not be ascertained through the questionnaire process concerns could be noted regarding whether GP's would be willing to participate in developments that could potentially raise their workloads. Previous experiences show that a major shift in resources is unlikely.

The development of pre-hospital integrated care pathways is not solely dependent on GP participation, however their effectiveness could be compromised should GP's not be willing to be involved. There are potential benefits to A&E departments with real cost savings in terms of consumables and potentially staff time. Further study is needed to assess what resources can be transferred to primary care from secondary care. The number of '999' emergencies that would fall within the integrated pre-hospital care pathway criteria would clearly influence this.

4. Identify those patient categories that could be managed with an alternative disposition.

This study sought to consider whether pre-hospital care pathways can improve the clinical effectiveness of emergency ambulance managed care and identified three clinical conditions, although it is feasible that there are many more. Although the principles of evidence-based practice are widely supported by the ambulance service, there is a dearth of good research evidence to justify many of the therapeutic interventions used in pre-hospital care. This is not true of all therapeutics and the benefits of some, such as the treatment of asthma, hypoglycaemia and convulsions are well established.

The outstanding issue would appear to be to promote evidence-based practice where there is evidence and to support research into those practices that at the present time are not evidence based. This would enable new pre-hospital integrated care pathways to be introduced that would satisfy the health professionals involved because they are 'evidence based'. It is noticeable that the three conditions selected are amongst those, which GP's are taking on a greatly extended role as part of their contracted arrangements.

Should pre-hospital integrated care pathways be viable then ambulance service training will need to be enhanced by a higher level of education that equips paramedics with the diagnostic skills to either leave patients at home or refer to a GP or primary care team. Some services are encouraging paramedics to undertake a new Bachelors Degree in Pre-hospital care, which will enable the development of Practitioners in Emergency Care (PEC's) with higher diagnostic skills. However unless all other factors are considered such as protocol development, clinical risk and the participation of GP's and other clinicians then their role could be a limited one.

However notwithstanding this if evidence-based research is expanded enabling other clinical conditions amenable to pathway management to be identified then together with PEC's the foundations would be in place that arguably make integrated care pre-hospital care pathways an alternative to current arrangements.

The introduction of pre-hospital integrated care pathways may have the potential to improve the ambulance service but this will never be shown if evaluation of the service

continues to measure speed of response. Therefore a mechanism must be found that will enable the service to be evaluated. The use of evidence-based medicine better provides the ambulance service with the opportunity to integrate with other health care providers and enable the development of protocols for paramedics that fit with other providers.

Structures arguably will need to change to enable a more integrated health provision as current ambulance service structures are aimed at providing a speedy response and do not generally consider issues such whether it may be more appropriate for other health providers to provide some of the current paramedic roles and vice versa. By evaluating quality of care, integrating with others will potentially enable ambulance service managers to be part of the clinical effectiveness debate consistent with Donabedians concept of the need to continually improve the health service through evaluation of all aspects of healthcare.

Generally there are likely to be resource implications to GP's and primary care teams but as previously stated there will be those who will benefit. Although the principle of pre-hospital integrated care pathways may seem sound, their introduction and development is dependent on cohesive government policies, which recognise the need to shift resources to where the need is greatest. Recent trends have shown there to be a rise in emergency admissions, which appears set to continue.

Strategies to prevent emergency admissions are widely discussed in the NHS particularly for those patients with pre-existing conditions such as asthma or diabetes. Most significantly is the need for the adoption of evidence-based protocols agreed by all local specialists, including staff in secondary care. This argument could be expanded to include the role of pathways and the effect that they can have on preventing inappropriate admissions by treating and managing patients at home or in primary care.

Any change is dependent on the public's willingness to use the service appropriately. Evidence to date suggests that despite changes in government policies the public still use the service, as they perceive their needs warrant. Longer term planning involving key players, which includes the ambulance service, must look to find ways either reduce the demand or enable patients to be more appropriately treated and managed. Some progress has been made with the introduction of NHS Direct and the development of

Category C calls for ambulance services. However what these initiatives arguably lack is a change in the infrastructure of services, which lead to culture changes not only from within the service but also how the public perceive and use the service. Both these initiatives provide alternatives to automatic transfer to hospital and care pathways can provide a mechanism for both NHS Direct and Category C calls to be further developed, whilst providing a means to audit both effectiveness and efficiency.

Whether ambulance services are prepared to change is beyond the scope of this study. What is clear, however, is that services continually embrace changes be they clinical or operational. Ambulance services recognise abuse of the service and also recognise those patients who are 'inappropriately' taken to hospital and it is therefore suggested that allowing more freedom of choice through care pathways will be amenable to most if not all professional ambulance personnel. The proposed improvements in training through the Practitioners in Emergency Care (PEC's) will undoubtedly provide the skills and knowledge that should make paramedics more acceptable to other health professionals. Whether GP's will accept paramedics as an alternative for some conditions remains the subject of further study. Given that demand for GP services is also rising then it is hoped through collaborative working and GP awareness of paramedic skills and effectiveness that any barriers that may exist are removed.

Evidence suggests that pre-hospital integrated care pathways are unlikely to be less clinically effective than current arrangements. Using resources more efficiently will allow an increase in overall benefits, as ambulances currently not available will become available with the potential to save life or contribute to improving the patient's outcome.

In conclusion it appears that pre-hospital integrated care pathways can provide a suitable and clinically effective alternative to automatic transfer to hospitals, which will enable resources to be more efficiently utilised. Although more research is required there would appear to be demonstrable cost savings to the ambulance service with more hours available for emergency cover.

It has not been possible within the present study to consider the full range of issues, for example medico-legal implications and clinical risk, which are relevant to the introduction of pre-hospital integrated care pathways. How these could impact on the

development of pre-hospital integrated care pathways are areas for further research. It is probable that there needs to be a wider debate regarding clinical risk and who is ultimately responsible. Currently Paramedic Steering Committees oversee the training and management of paramedic interventions. Should GP's become involved in developing standards and protocols the debate would potentially revolve around who is clinically responsible, secondary care or primary care.

It is recommended that further research be undertaken to validate the effectiveness of pre-hospital integrated care pathways through a controlled trial. However before this could happen there are opportunities for further research as follows: -

- As explained previously the acceptability to the patients (or community) was beyond the scope of the present research therefore there is an opportunity to explore patient's acceptance to the concept.

- Clearly there may be issues surrounding potential clinical risk which need to be fully evaluated

- Although there was general agreement amongst clinicians regarding the development of pre-hospital integrated care pathways there was also concern expressed regarding potential medico-legal implications, which were beyond the remit of this study. This aspect will need further investigation.

- There was also concern between GP's as to whether there would be a shift in resources from secondary care to primary care. Although exploratory research has been undertaken here further study is required as to whether pre-hospital integrated care pathways would create a shift in resources.

- The study suggested that there are real cost savings to the ambulance service and gave a crude estimation of what those savings could be. Further research will be required to assess more accurately the cost savings and indeed the impact of releasing emergency ambulances quicker through non-transfer of patients to hospital.

- The study did not cover whether there would be an acceptance to change from ambulance services. Given that strong traditions exists, further study needs to be undertaken to ascertain whether services would be prepared for a move away from traditional methods of working.

- As stated there is a move towards paramedics being trained as Practitioners in Emergency Care (PEC's) with more skills regarding diagnosis and treatments available to them. Their impact on pre-hospital integrated care pathways will need to be evaluated particularly with regards to clinical freedoms. Currently paramedic's work to protocols and the question to be posed is will PEC's be able to work to clinical guidelines.

- Further work is required to assess how many clinical conditions can fit the model proposed given that PEC's will be potentially be making decisions against a broader range of clinical conditions than those used in this study.

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10 GLOSSARY OF TERMS

Agonist A drug that combines with receptors and initiates a sequence of biochemical and physiologic changes.

Asthma A condition characterised by dyspnea, bronchoconstriction, mucus plug and wheezing.

Asymptomatic Showing no symptoms.

Cardiopulmonary Resuscitation (CPR) Artificial ventilation and external chest Compression

Defibrillation The use of unsynchronised direct current (DC) electric shock to terminate ventricular fibrillation

Diazepam See Valium

Emergency Medical Technician (EMT) a member of the ambulance crew with less skills and knowledge than paramedics.

Epilepsy A disease characterised by seizures

Epistaxis Nosebleed

GCS (Glasgow Coma Scale) A system for determining the level of unconsciousness

Glucose A simple sugar. Its dextro-form (dextrose) is commonly used in intravenous solutions

Glucagon A hormone of the pancreas which raises the blood sugar level by mobilising liver glycogen.

Haemorrhage Bleeding, particularly if excessive

Hypoglycaemia Abnormally diminished concentration of sugar in the blood

Insulin A hormone secreted by the pancreas that promotes utilisation of sugar by the body.

Intubation The placement of a tube through the glottis into the trachea

Ketoacidosis The condition arising in diabetics whose insulin dose is insufficient to meet their needs, wherein blood sugar reaches high levels and fat is metabolised to ketones and acids.

Medical Priority Dispatch (MPDS)

Myocardial infarction The damaging or death of an area of heart muscle resulting from a reduction in the blood supply to that area

Nalbuphine hydrochloride Analgesic used in the field to relive pain given Intravenously

Nebuliser A device that delivers water or liquid medication in the form of a very fine spray.

Salbutamol A bronchodilator used in the treatment of asthma.

Steroids A group of substances with a common basic structure. Slight differences in the chemical configuration produce greatly divergent biological effects.

Syncope Fainting; a brief loss of consciousness caused by inadequate blood flow to the brain.

Thrombolytics An agent that breaks down clots

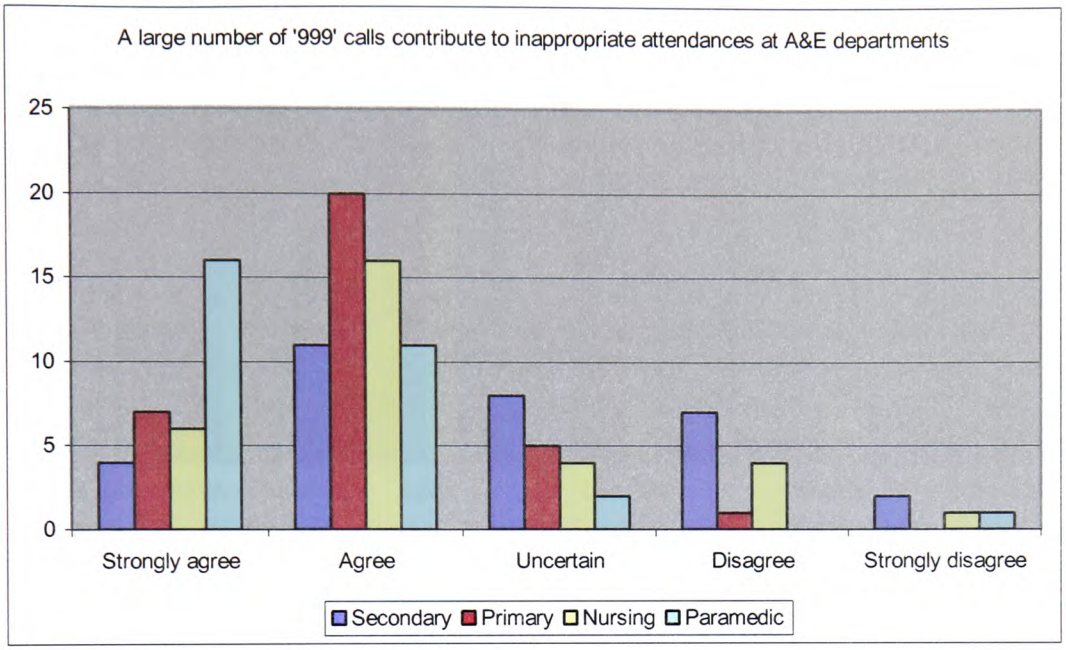
Thrombosis Coagulation of blood in the vessels. The clot thus formed is termed a thrombus

Valium A chemical which has muscle relaxant qualities and is valuable when given by injection in status asthmaticus and for convulsive spasms.

Ventricular Fibrillation Rapid, tremulous, and ineffectual contractions of the cardiac ventricles; cardiac arrest

APPENDIX 1

Graph 1



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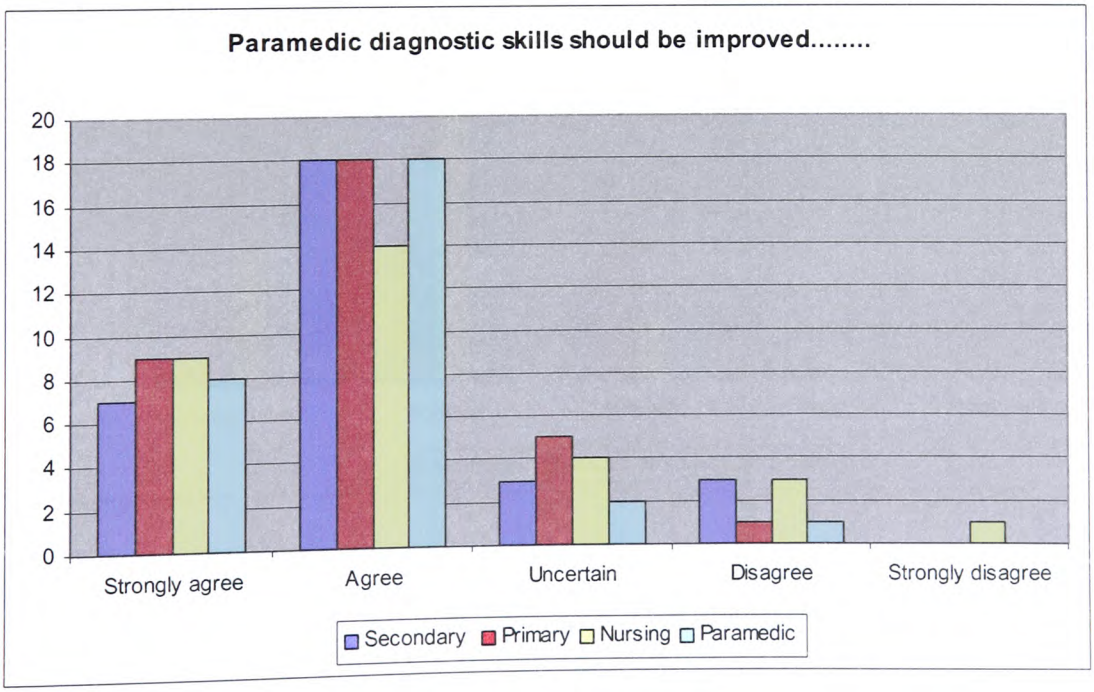

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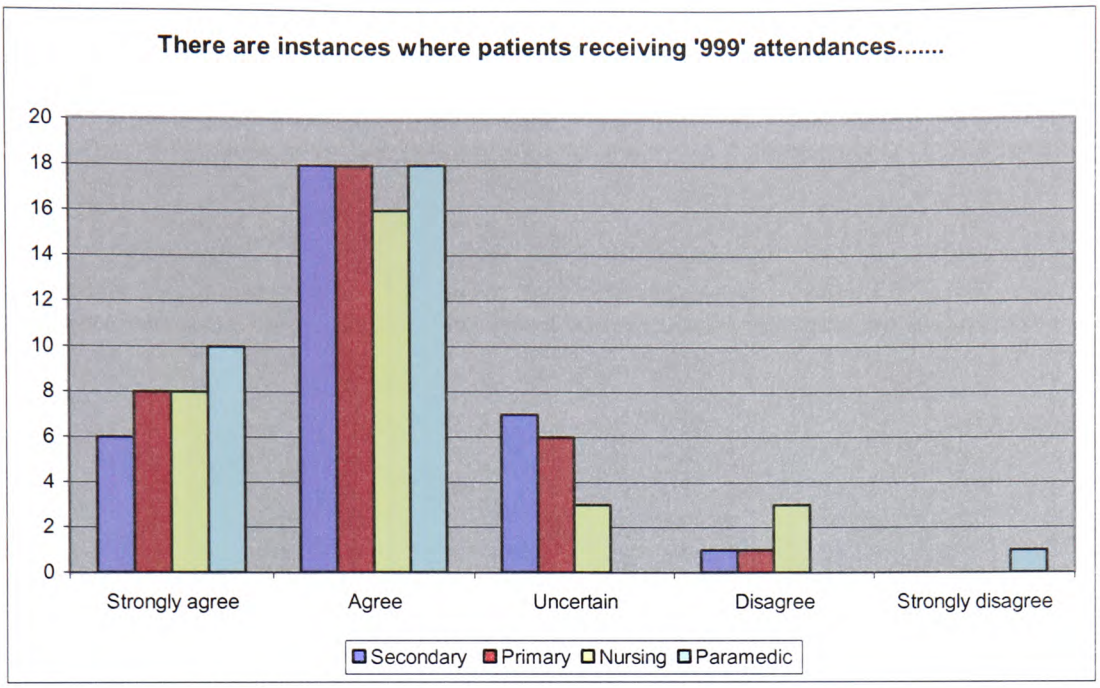

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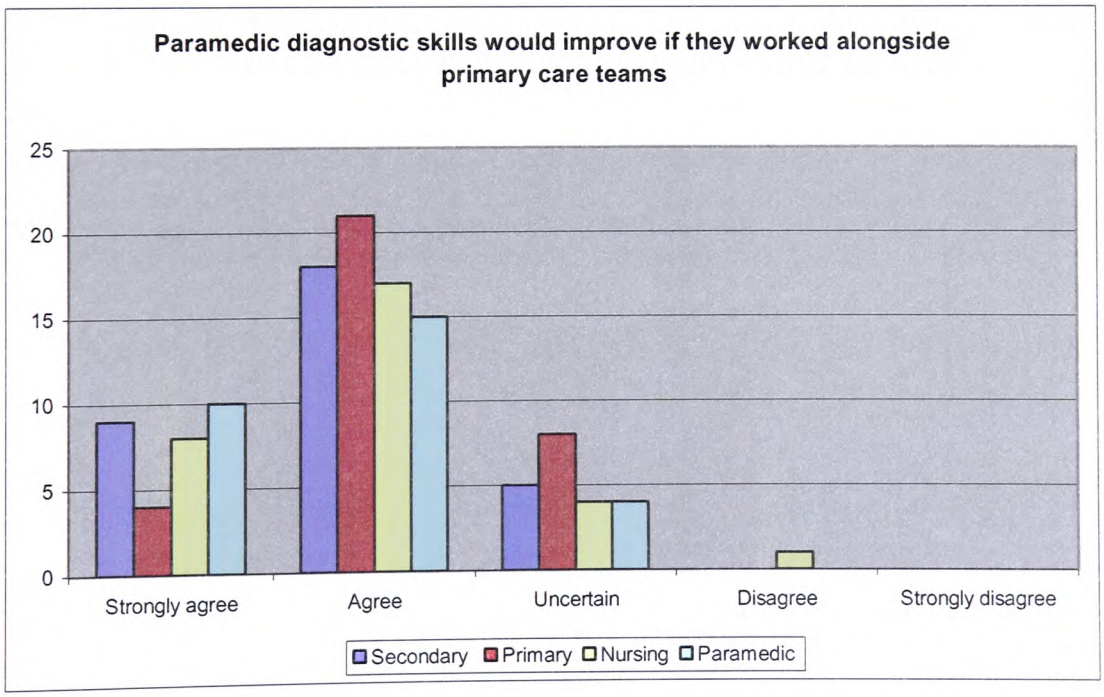

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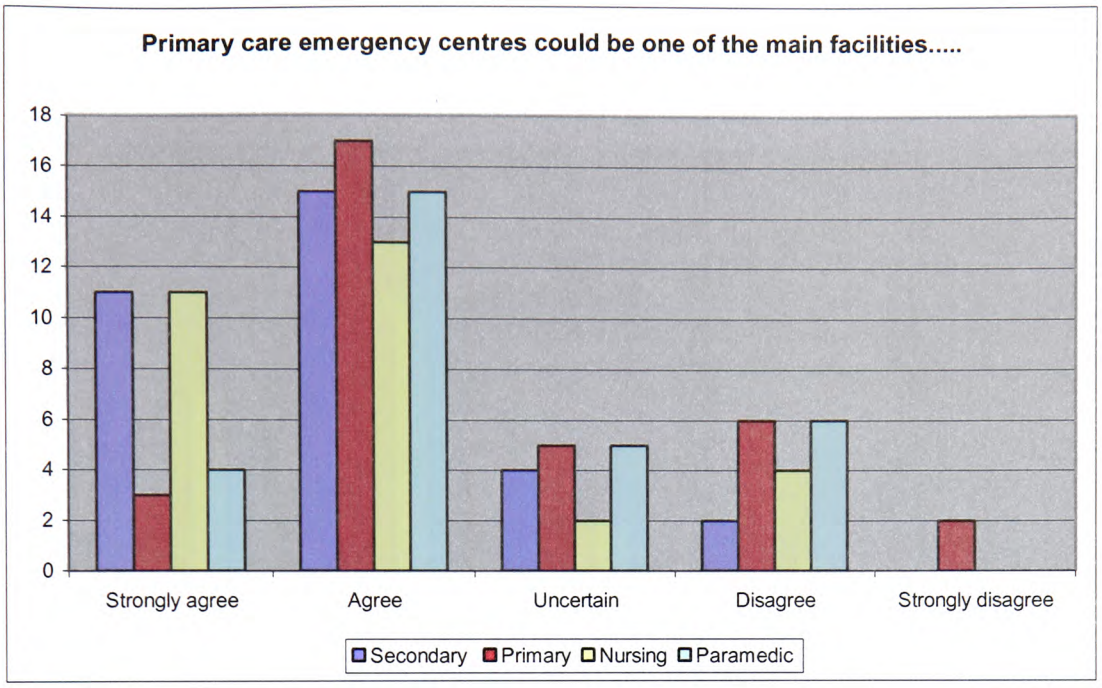

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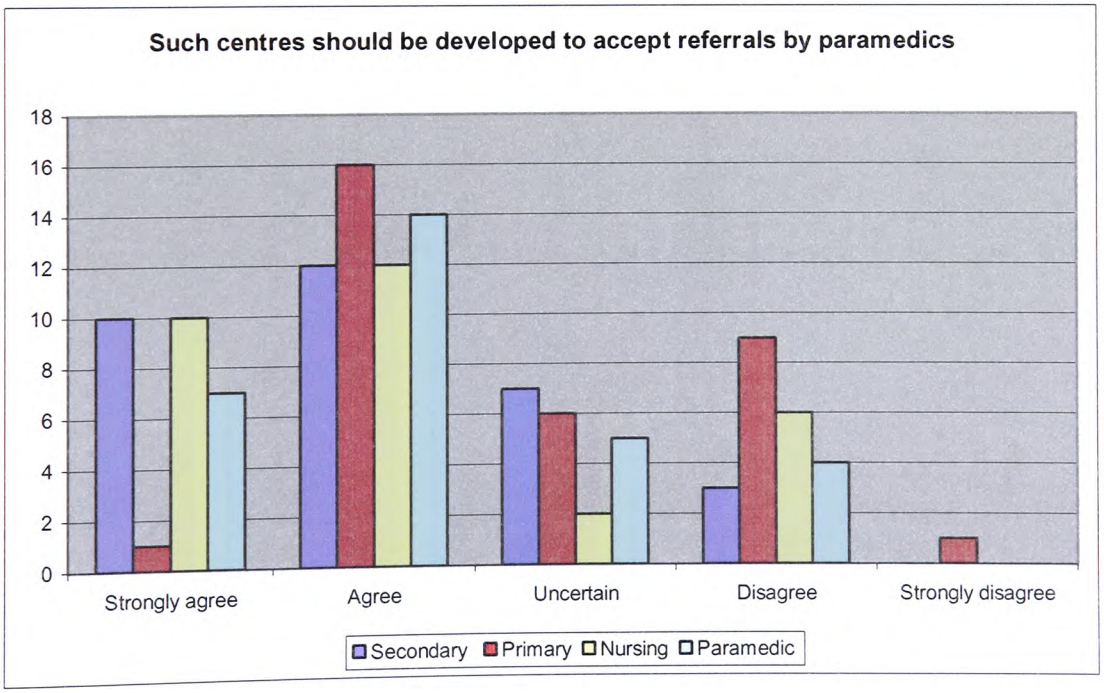

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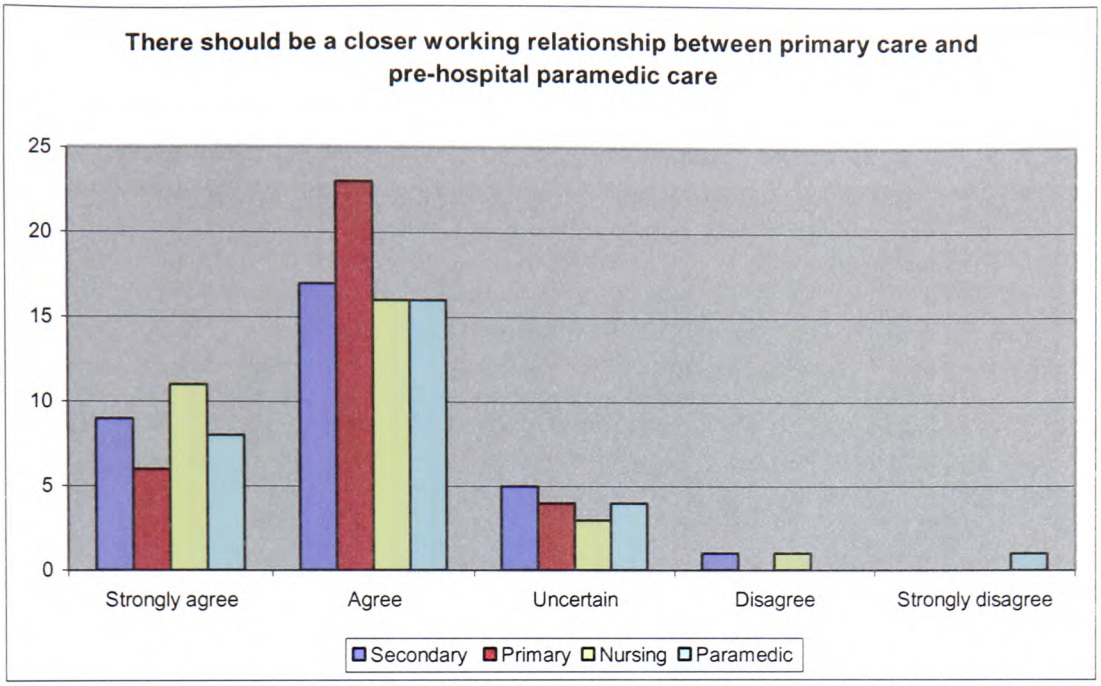

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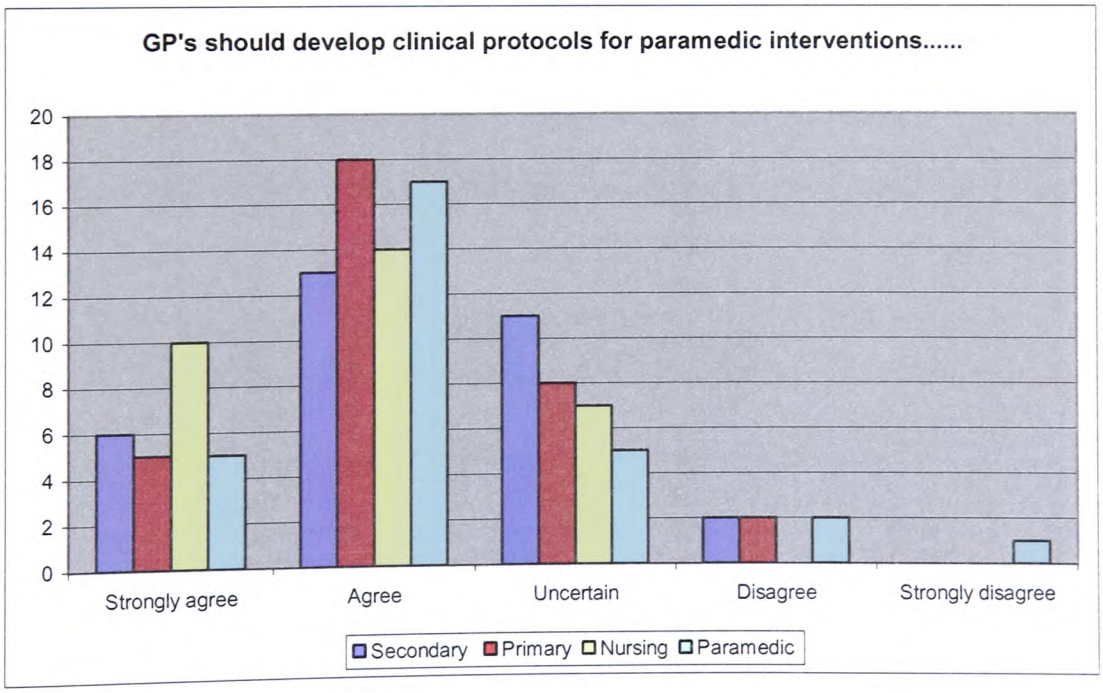

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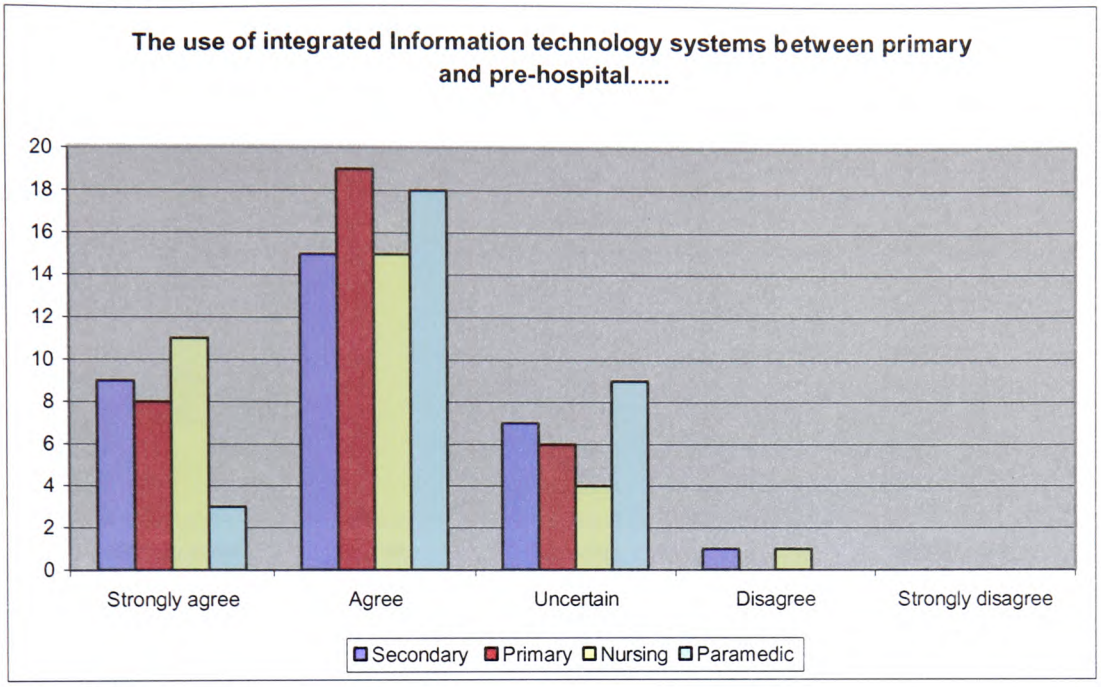

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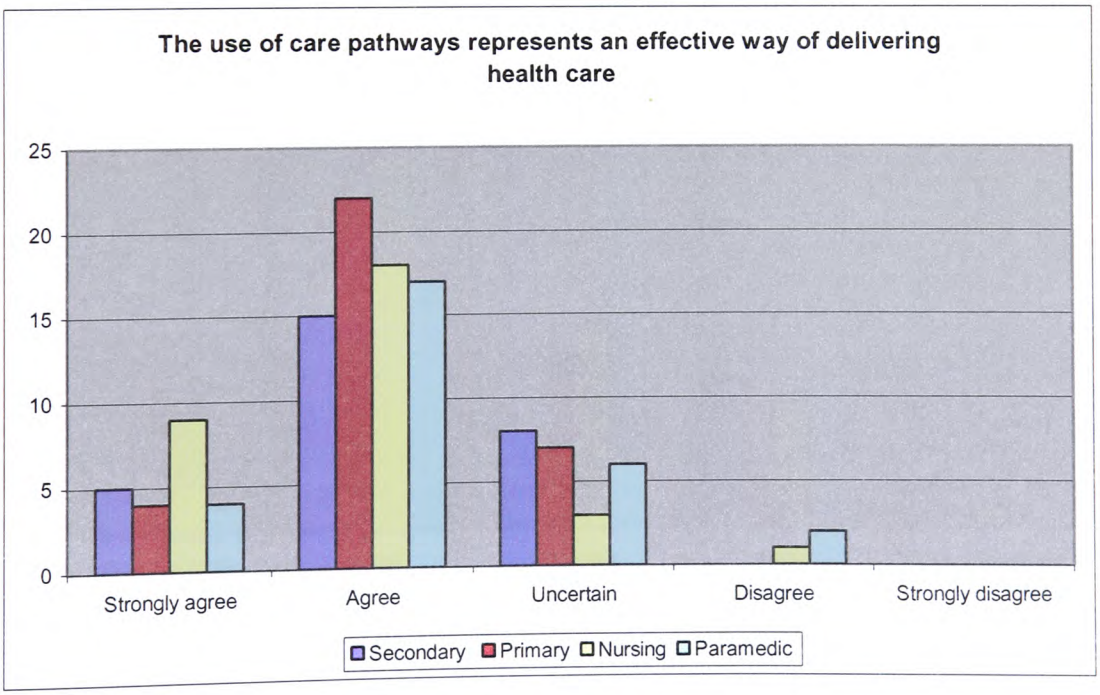

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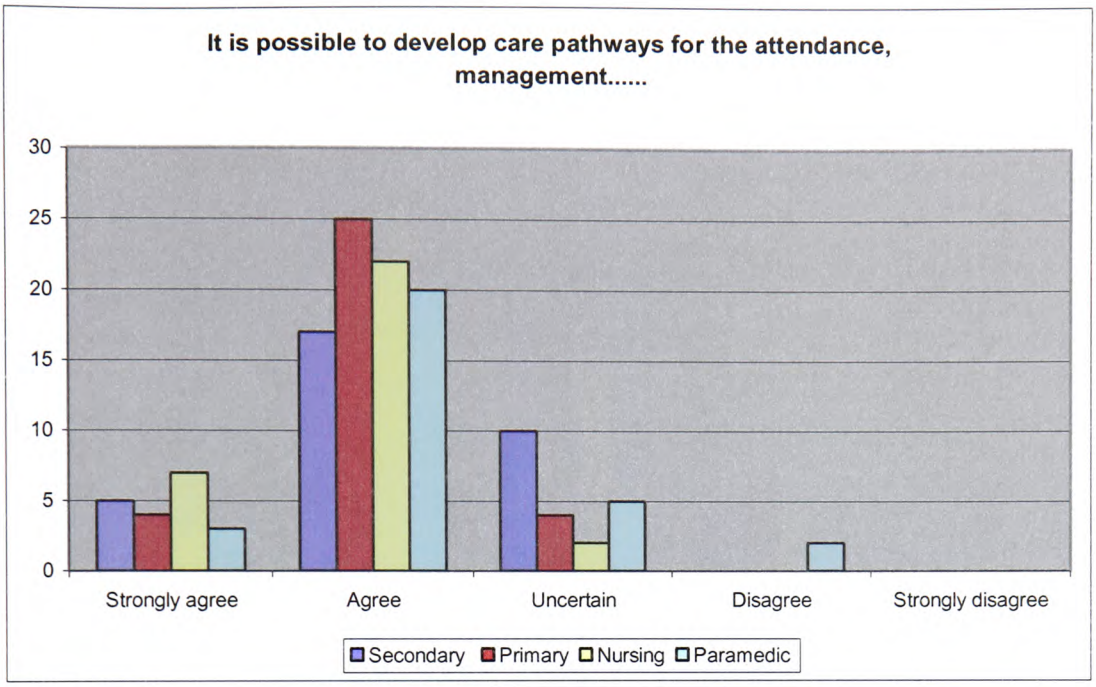

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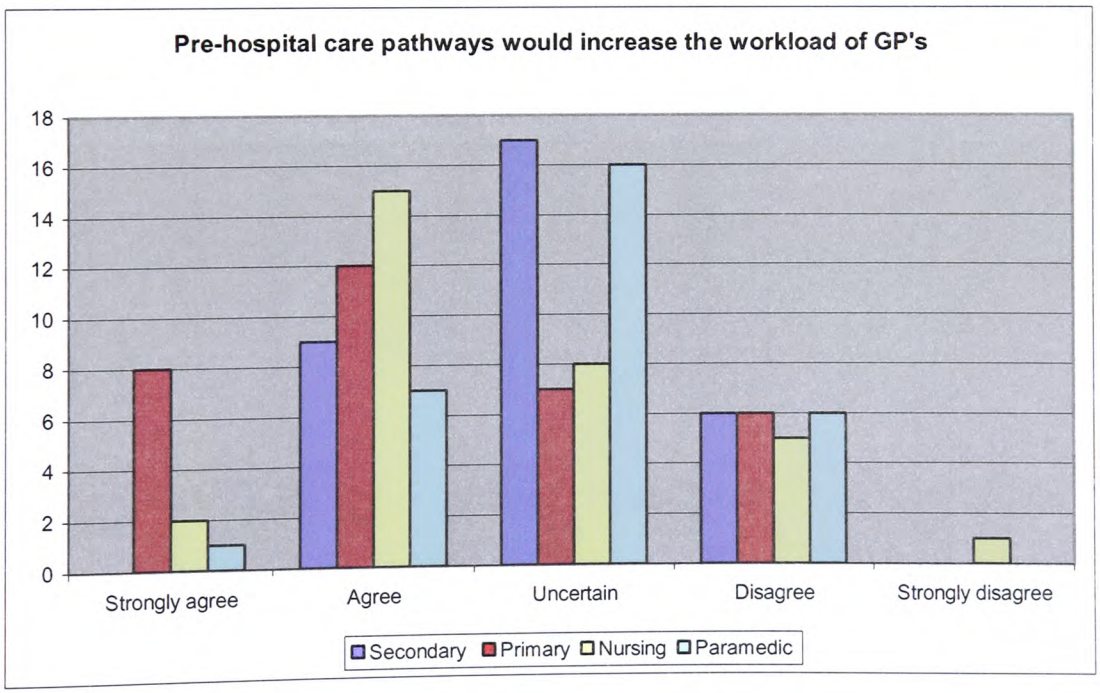

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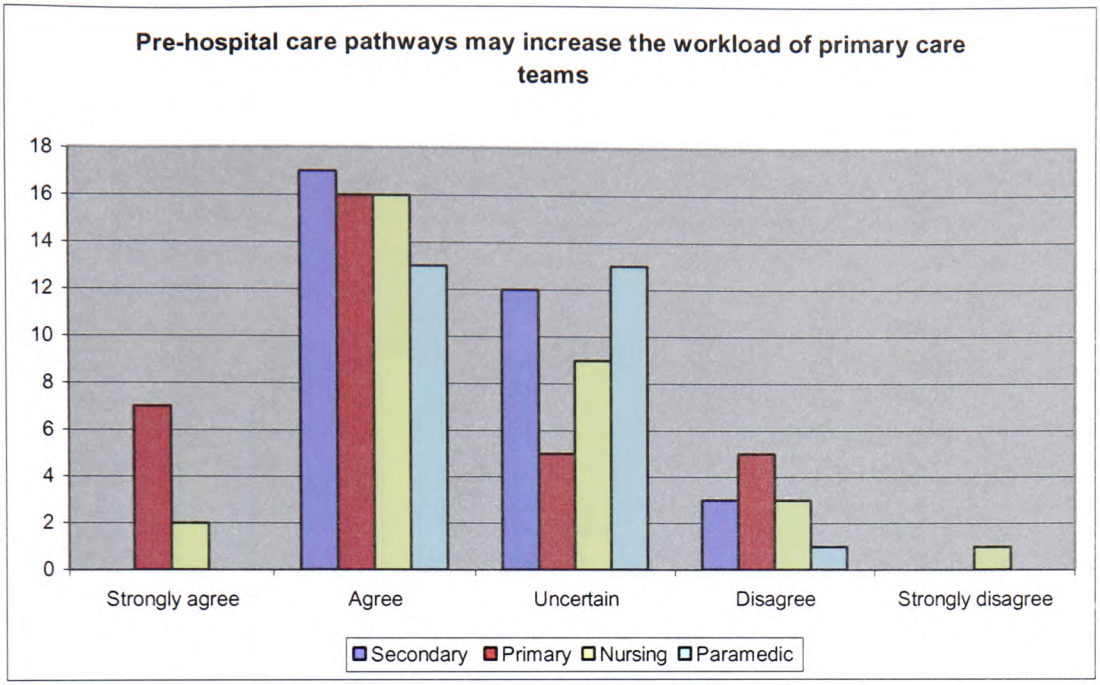

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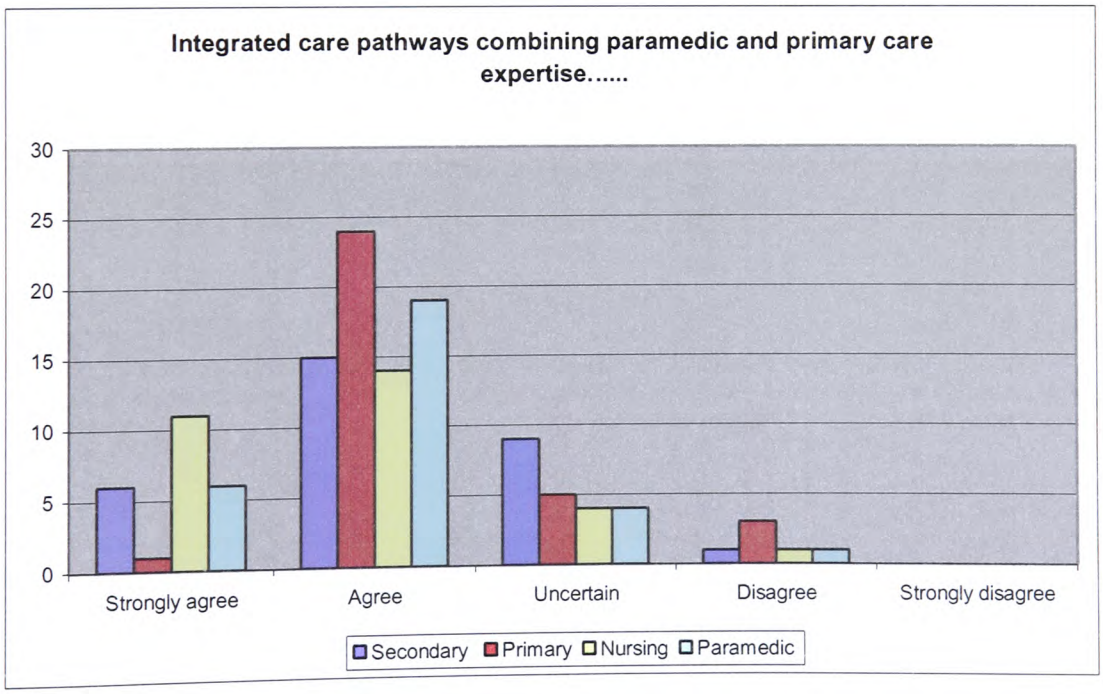
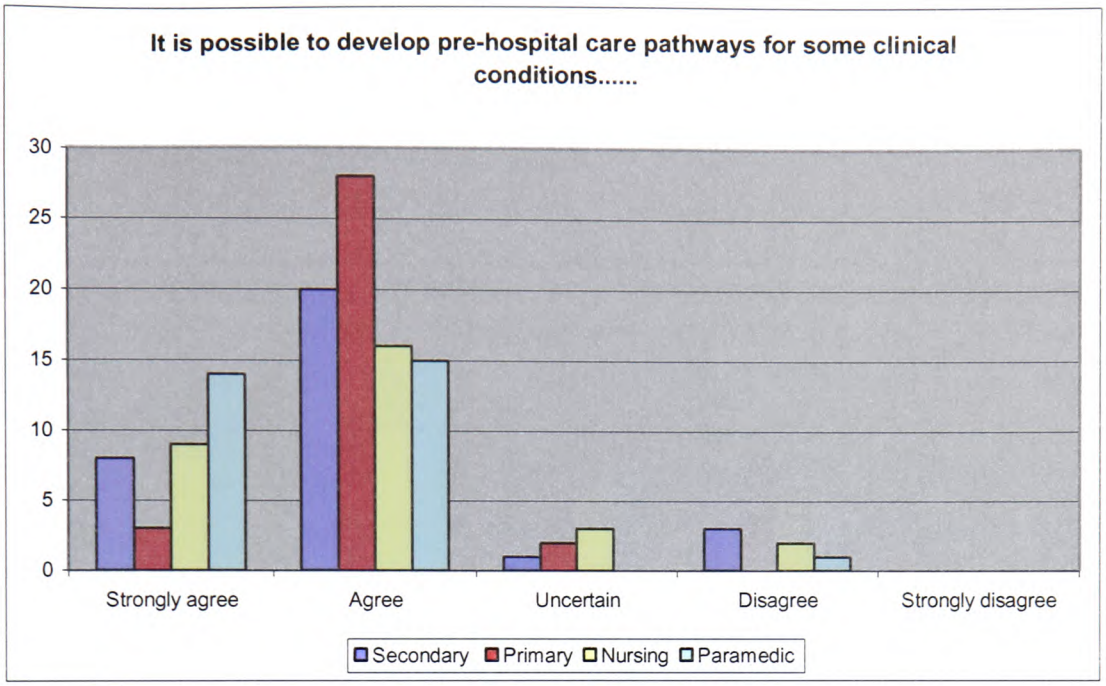
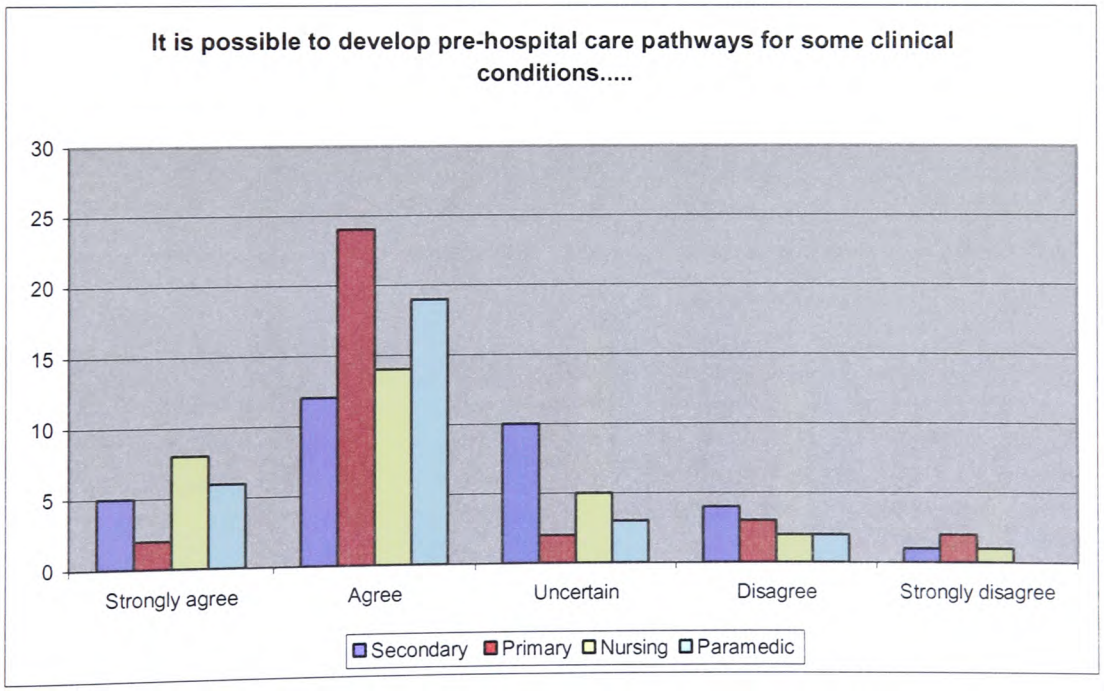


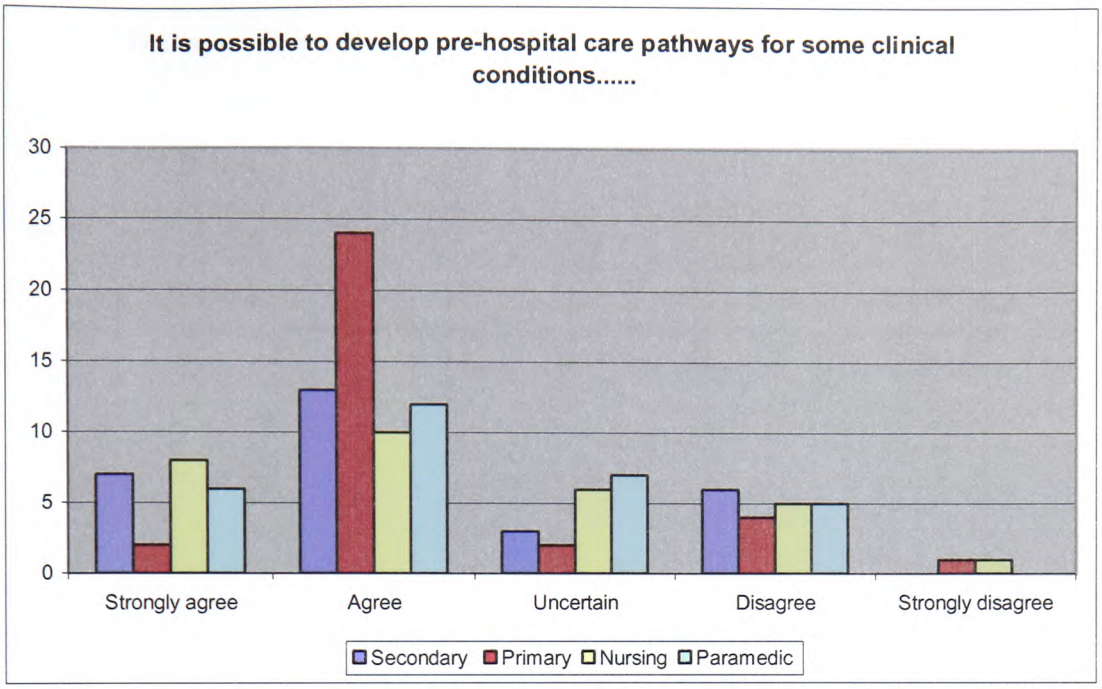
Graph 15 (Diabetes)



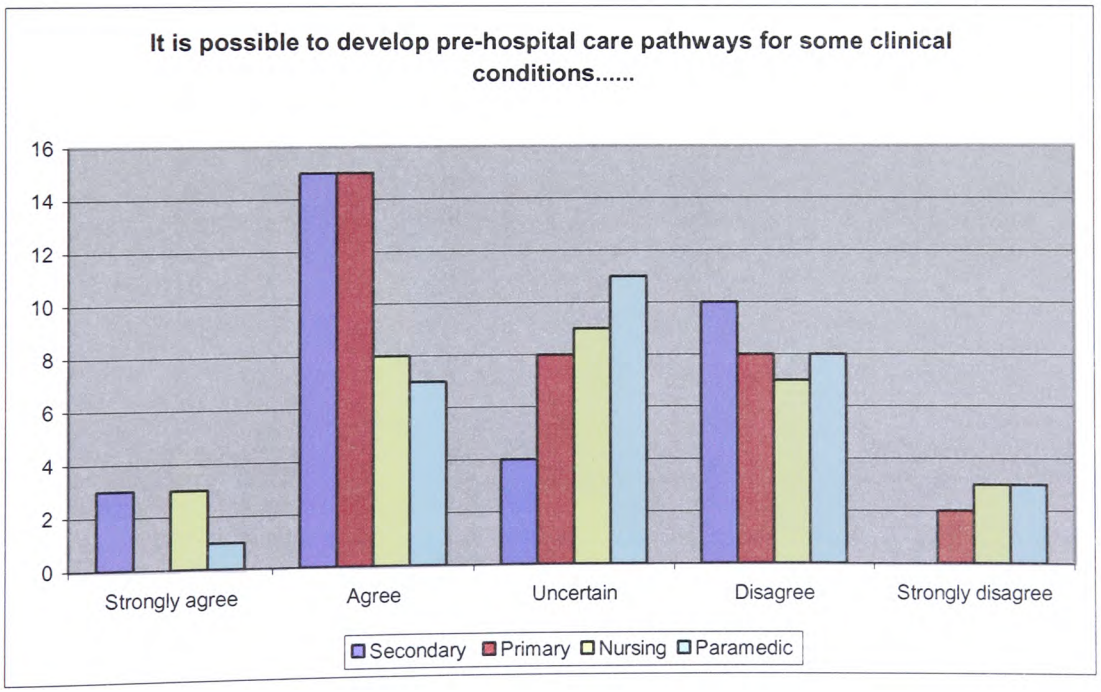
Graph 16 (Asthma)



Graph 17 (Convulsions)



Graph 18 (Psychiatric)



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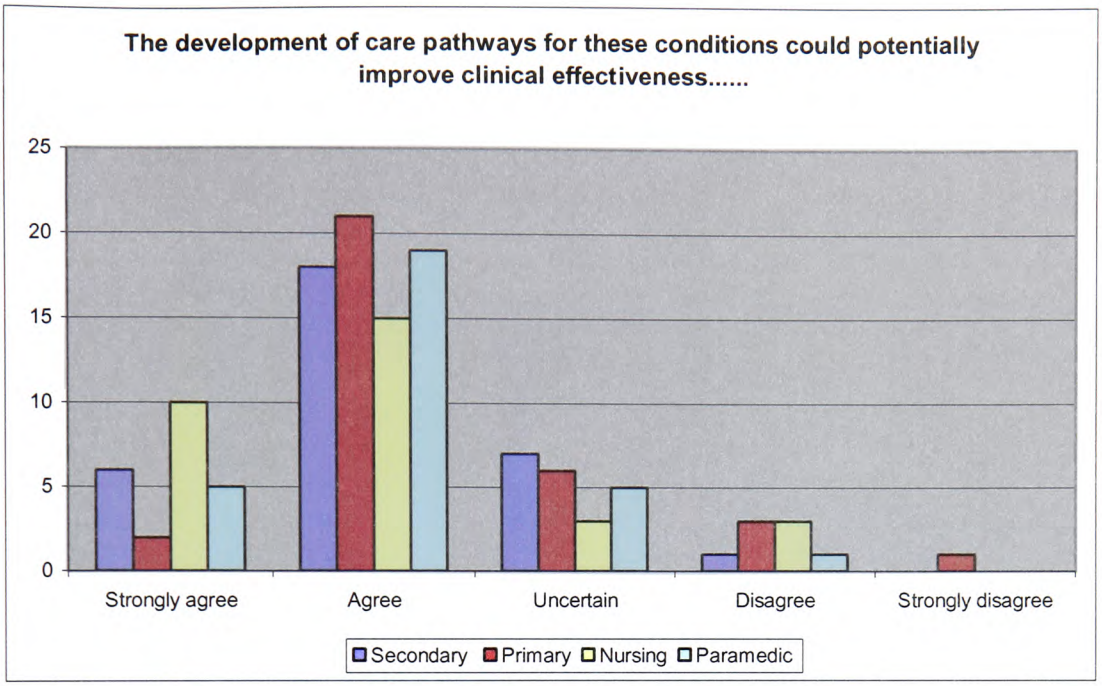

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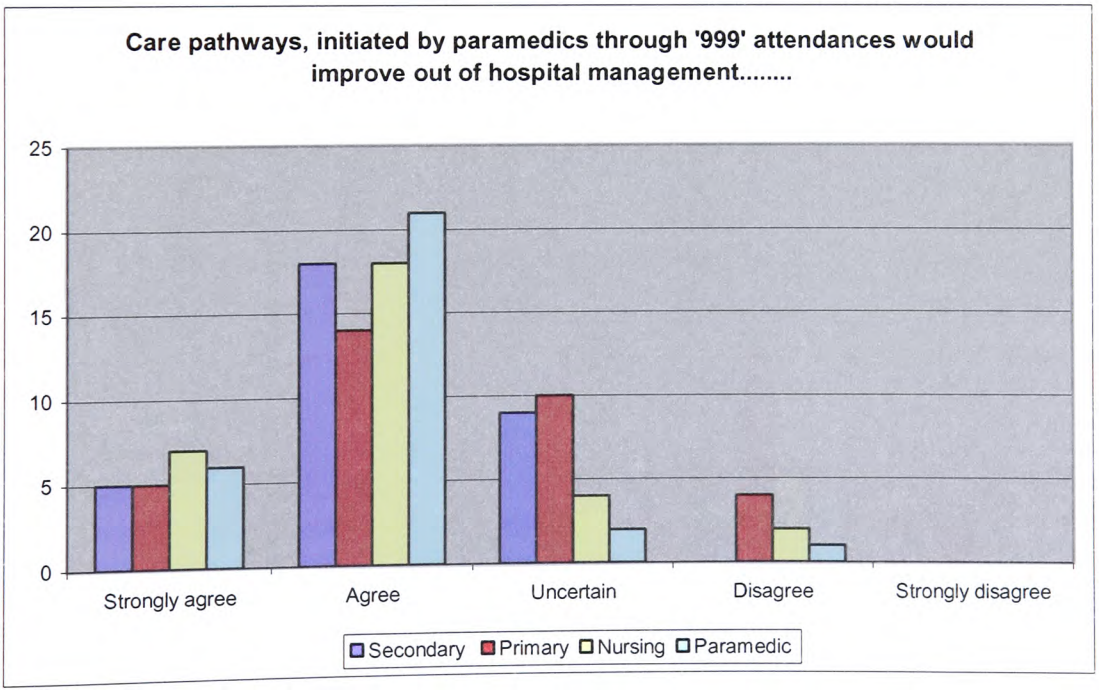

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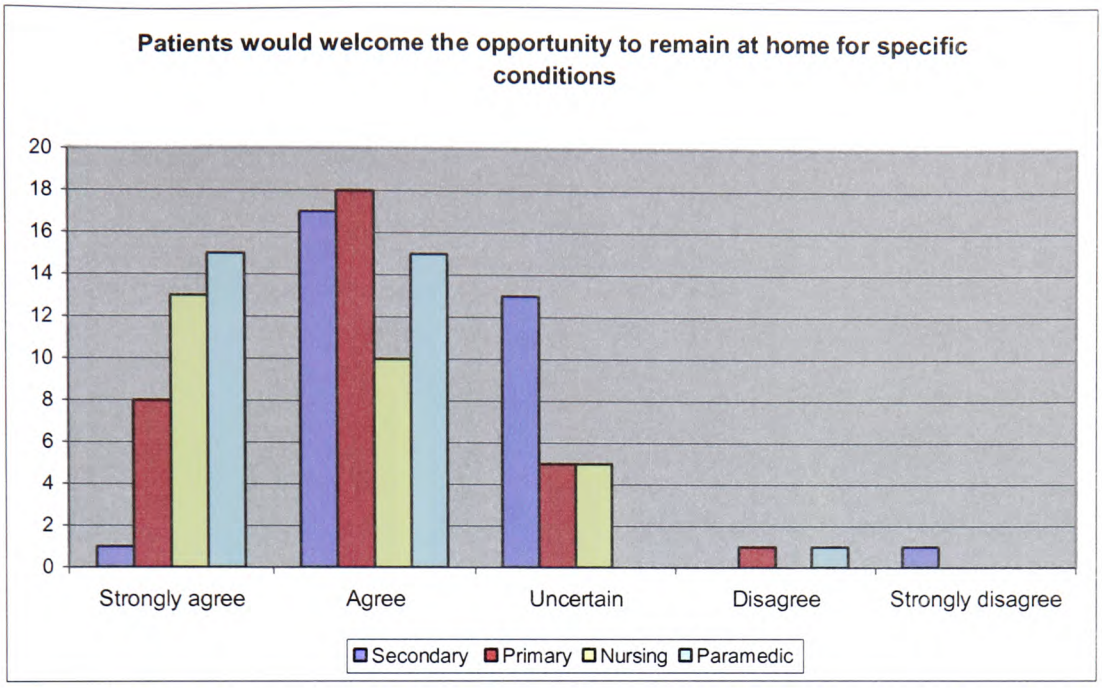

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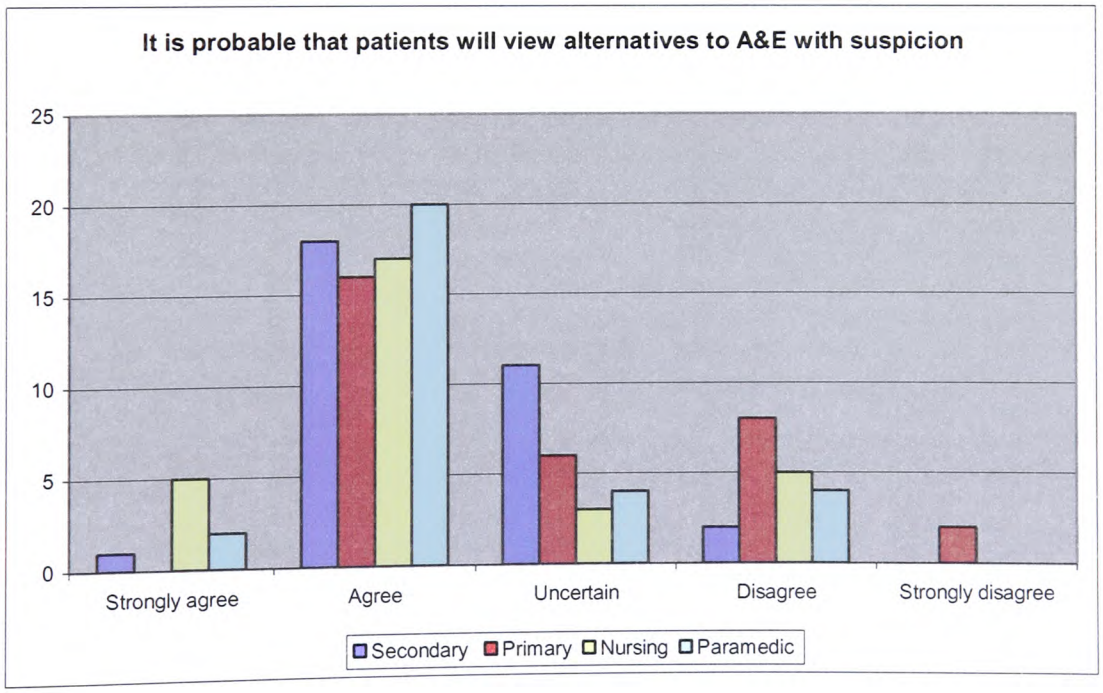

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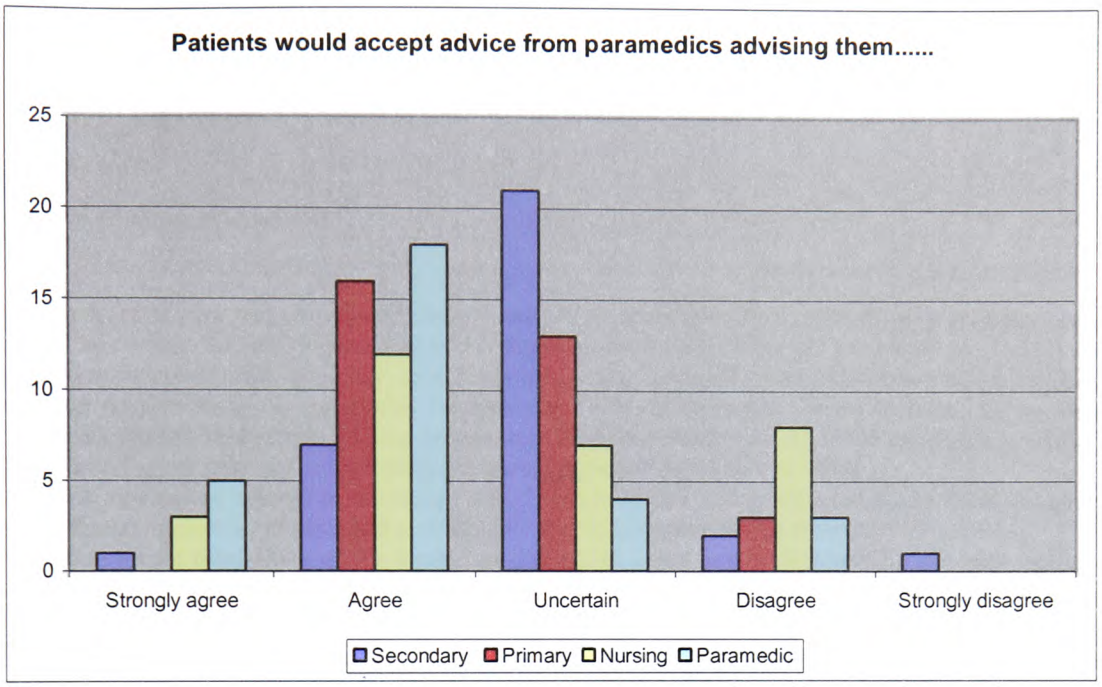
Patients would accept advice from paramedics advising them.....
25
20
15
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5
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Strongly agree
Agree
Uncertain
Disagree
Strongly disagree
Secondary
Primary
Nursing
Paramedic

Discussion paper

Pathways to effective integrated pre-hospital care

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The traditional principles of the ambulance service have served to underpin developments in pre-hospital care, which together with increasing skills of paramedics and technology have both raised the profile of the service and arguably contributed to improvements in patient care. However despite these advances patients are still transferred to hospital following treatments from paramedic responses to '999' emergencies. Evidence from the on-scene treatment of diabetics suggests that certain patient groups can be appropriately managed in the community without recourse to either secondary or primary care through increasing paramedic judgement skills.

Although this alone may not be enough to encourage support from health care professionals, the development of pre-hospital care pathways with strict clinical and non-clinical criteria may provide the answer.

Increasing demands on all disciplines of the health service are to some extent determining the pace at which professionals work in finding solutions to more clinically effective care. The following paper offers a hypothesis that could potentially integrate paramedics more fully into the health care system.

Journal of Clinical Effectiveness Vol. 3 No. 4, 1998: 166–169

Tradition

The traditional role of the ambulance service has been to respond, treat and transfer patients to accident and emergency departments, largely because no other recognized alternatives are available. Key principles outlined in the ambulance service basic training manual, to save life, prevent deterioration, promote recovery and transfer to hospital have served to underpin developments in pre-hospital care with debatable degrees of success. However despite increasing skills of paramedics and advances in technology, arguably nothing much has changed. A plethora of pre-hospital care literature can be confusing when trying to determine whether paramedics are effective, or ineffective when dealing with certain conditions, particularly trauma and cardiac care. This could be partly due to research methodologies applied or limited evidence that constitutes effective outcomes generally applied to interventions, be they pre-hospital or otherwise. While the benefits of pre-hospital stabilization of critically injured patients is argued by some as being inappropriate[1–4] others such as Bissell and Eslinger[5] believe that there is a positive correlation between paramedic interventions and survival for cardiac arrest patients as well as those suffering major trauma. Whether paramedics make a difference to the survivability or outcome of patients remains part of a wider debate with more research on paramedic effectiveness needed. What is not disputed is that there is potential for developing the role that the paramedic has to play in the health care chain.

The development of pre-hospital care pathways may represent one way in which the skills of paramedics can contribute to the ever increasing demands for health care, by developing protocols with strict clinical and non-clinical criteria enabling patients responded to as '999' emergencies to be managed in the primary care setting. This will also potentially further raise the profile of the service as a key player in the provision of integrated care.

Increasing paramedic judgement skills

A recent review of ambulance service Patient Charter Standards served to address one major aspect of ambulance care, that of being able to prioritize '999' calls, enabling the most appropriate resource to be dispatched to the call. While this will undoubtedly increase the number of lives saved each year, especially those in cardiac arrest (3,000 each year),[6] patients will invariably be transferred to A&E departments regardless of their condition following treatment administered by paramedics because of the lack of alternatives.

The issue of whether to increase the judgement skills of paramedics allowing them to decide where patients would receive the most appropriate managed 'best care' has been recognized as being worthy of consideration. The recent report *Opportunities in Emergency Health Care*[7] identified that judgement skills of paramedics should be increased to enable them to decide whether to bypass local facilities and go direct to more appropriate care

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facilities. This is reinforced by a further report, *Developing Emergency Services in the Community*,[8] which recommended that paramedics should become more skilled in emergency work with wider discretion about initiating treatments and have more independence in choosing the best destination for the patient. Both reports recognize the paramedic as an integral part of the health care team.

Effectiveness

It could be debated that rather than focusing on the effectiveness of the paramedic as an element of the health care system, it is perhaps more appropriate to focus on the effectiveness of the whole process, integrating paramedic interventions into the care planning for each clinical condition. Potentially this could lead to the development of clinical standards for specific patient groups regardless of how the patient accesses the health care system.

The issue about paramedic effectiveness is one that will undoubtedly be debated for some time, with the main measure of service continuing to be that of efficiency, which is arguably reasonably simple to report. However continuing emphasis on evidence-based practices suggests that reporting on efficiency alone is not sustainable in the longer term. Considerable thought needs to be given as to how paramedic effectiveness is to be determined, when it is considered that even after 50 years the NHS still cannot prove its effectiveness, although through indicators and processes is able to demonstrate its efficiency.[9] It is perhaps more appropriate therefore to research the effectiveness of paramedics as part of the holistic approach to health care and not in isolation.

Patients' views

Patients and the public in general appear to have accepted paramedics, with the power of the media arguably contributing most to this acceptance. However, public expectation is growing, with the NHS continually being challenged as to whether it is meeting the needs of the patient and the community, and can prove that it is doing so. While the media has served as a powerful marketing tool, increasing the status of paramedics, the question needs to be asked, how much has it raised patients' expectations.

Patients value the ambulance service and have become involved in the planning and organization of how services operate, mainly through local Community Health Councils. According to Holland[10] effective health care in the future could arguably depend on the public's acceptance in that: 'Acceptability is a very important, although often overlooked, aspect of health care. If the health care offered is unacceptable then regardless of its effectiveness or efficiency it may fail to achieve the stated objective if the population refuses to utilise it.'

This perhaps fuels the debate that patients should become more involved in the planning of services and should be given choices regarding their clinical management.

A partnership approach

The introduction of the Clinical Effectiveness Initiative launched by the Secretary of State for Wales during 1995,[11] together with the policy shift from secondary to primary care, provides a focal point for ambulance services to strengthen partnerships with primary care colleagues and patient representative groups. In addition the recent change of government has set the scene by ensuring that partnerships and joint planning represents the way forward, by removing competition as demonstrated in government planning guidance. Several ambulance services have embraced this approach and are working closely with GPs and primary health care teams, developing co-operatives and deputizing for junior doctors on hospital wards, confirming the willingness of services to seek new initiatives. This is a testament to the development of the service in a relatively short span of time and shows the acceptance of the service by other health professionals. These were not necessarily due to government policy changes, but resulted from a genuine desire for the need to become more integrated in providing efficient and 'effective' services.

By developing a partnership approach with other health professionals the total effectiveness of all care interventions can be evaluated, allowing patients, who are able, to remain at home following treatments resulting from a '999' emergency call. One method of achieving this is through the development of pre-hospital integrated care pathways, which consider all appropriate aspects of health care.

Integrated care pathways

A great deal of attention has been devoted by health professionals within the United States and United Kingdom to the use of multi-disciplinary care models to improve team working, reduce morbidity and increase patient and staff satisfaction. What they seek to define is the expected course of events in the care of a patient with a particular condition, within a set timescale. A pathway is divided into time intervals during which specific goals and expected progress are defined, together with appropriate investigations and treatments, reflecting the activities of all members of the multi-disciplinary team.

Care pathways currently only serve to consider treatments and interventions of those patients who access the health care system through a '999' call and are admitted to a hospital. What they do not consider are those patients who do not attend hospital as a result of a '999' emergency call and are not transferred e.g. those who refuse to attend following on-scene treatments, such as diabetics and epileptics. In addition the care pathways begin when 'definitive' care in A&E departments is given rather than when the paramedic initiates treatments, despite the care often being replicated.

There are generally no formal audit links with secondary or primary care professionals except where local protocols exist, although most services would agree that relationships with A&E staff are excellent. Ambulance services carry out audits, as do hospitals, but apart from trauma and cardiac cases these are largely undertaken in isolation and do not lend themselves to measuring outcomes for specific clinical conditions.

Integrated Care Pathways provide a powerful audit tool, as all aspects of patient care are constantly monitored and variations from set standards are minimized. Clinical outcomes and the quality of patient care can be improved by this reduction in variation of clinical practice.

The types of medical conditions responded to, as '999' emergencies, which could be considered for alternative methods of managed care, are arguably limited. One such condition, although not researched in great depth regarding pre-hospital care, is diabetes. This condition, when treated by paramedics, has a significant impact on the patient's recovery and could potentially be one group of patients that are not transferred to hospital.

Diabetes

Limited research shows that a notable percentage of patients attended by paramedics and treated as hypoglycaemic patients either refuse, or do not require, hospital treatment. Studies regarding the treatment of hypoglycaemia have demonstrated that glucagon or glucose administered by ambulance staff results in a significant improvement of the patient's condition (Weston 1990),[12] (Yaxley 1991),[13] and (Steel 1992).[14] Weston (1990) found that of the patients attended (n=35) only 11 (31%) ended with admission to a hospital ward. Yaxley (1991) reported similar findings with only three (12%) patients transported to hospital from a total of 25 responses. The largest of the studies, undertaken by Steel (1992), found that of the number attended (n=103) 24 (23%) recovered quickly and refused to go to hospital, and 62 (60%) were discharged from hospital with no further treatment. Of those treated only 7 (6%) were admitted for further treatments. A similar study carried out by the Mid Glamorgan Ambulance NHS Trust (unpublished) has shown that of those patients attended (n=66) 22 (33%) refused to attend hospital once they had received paramedic treatments. A further eight who were transferred to A&E were discharged with no further treatment being given. Although further research is required, what all the studies identify is that a significant number of patients are capable of being managed within the community rather than being transferred to hospital. However, the important contribution that the A&E department makes in assessing these patients for underlying conditions cannot be ignored; transferring this role would require facilities to be available in the primary care setting as this aspect of care would be beyond the abilities of paramedics.

Other conditions such as epilepsy, minor injuries and some chronic breathing difficulties could arguably be subjected to the same hypothesis of integrating paramedics into primary care although this requires much more research.

A change for the better?

The Welsh Ambulance Services NHS Trust is currently undertaking a major study into the development of care pathways in partnership with other health professionals. The principles of the Clinical Effectiveness Initiative underpin the study and seek to identify those clinical conditions responded to and treated by paramedics as '999' emergencies which, in the opinion of clinicians, can be managed in the community. Care pathways will be developed allowing paramedics to make the decision as to where the patient will receive the most appropriate treatment. This will only be possible if strict clinical and non-clinical criteria can be developed which have the confidence of all health professionals involved in the care. It is accepted that any pathway would need to be rigidly tested and have a series of decision rules that have a sensitivity of 1.0 to minimize the risk to patients.

This means moving beyond the traditional processes of responding within Patient Charter Standards, treating and transporting and will undoubtedly have implications for training, medical legal considerations and contracting and must be subject to clinical acceptance of alternatives. Therefore it is recognized that all of this must be supported by evaluative research and appropriate protocols developed in partnership with clinicians if change is to happen.

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Integrated paramedic care – a vision for the future

David Ellis

Although well-established in the US, paramedic care is a relatively new concept in the UK. This paper describes a project in South Wales aimed at better establishing such models of care.

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An ambulance service in South Wales is currently undertaking a project that will potentially challenge the traditional method of treating and transferring 999 emergency patients to hospital accident and emergency departments. The project based on proven paramedic effectiveness aims to develop alternative models of health care presenting 'clinically effective' care pathways for conditions such as diabetes, asthma and convulsions responded to as 999 calls.

Effective paramedic skills

Literature is widely available demonstrating the efficacy of paramedic interventions covering an extensive range of clinical and trauma conditions. Although a substantial amount of research originates from the United States, there is considerable literature generated from the UK, despite paramedic development in the UK being relatively new compared to the US. The available literature covers a vast range of topics such as advanced life support reviews (Bissell and Eslinger 1994), to more specific aspects such as pre-hospital treatment for cardiac care (Eisenberg et al 1996). What they all suggest is that on scene treatments not only save lives, but also have an important role to play in contributing to quality of life.

Despite evidence of on scene effectiveness, it is perhaps somewhat surprising that, due to lack of alternatives, patients are still transported to accident and emergency centres- albeit with a general NHS policy shift towards primary care. Could this be due to a perception that the ambulance service is still predominately transport orientated?

The recent report *A Review of Ambulance Performance Standards* has been well received amongst ambulance professionals and provides the impetus for change. All English Ambulance Services will begin to prioritise 999 emergency calls, from October 1997, helping to ensure that appropriate resources are despatched to appropriate calls, with the response dependent on whether the condition is life-threatening or serious. Preliminary research undertaken by the Review of Ambulance Performance Standards steering committee concluded that several thousand lives would be saved each year as a result of this review.

While this is laudable and signifies another major step forward for a relatively new player in health care provision, the clinical autonomy of the paramedic on scene will potentially not change beyond local protocols. Patients will continue to be transferred to hospital. What is lacking is evidence that integrating paramedics into primary care would prove to be both clinically and cost effective and arguably, with the recent change in government, the time is right to undertake this research in order to influence longer term planning of resource utilisation.

There would appear to be extremes in recognising the potential for prehospital contribution to health care. One argument suggests that the ambulance service is now 'metamorphosing from a transport division into a core service around which mould breaking plans for the future can be formulated' (Holland 1995) Several ambulance services are currently collaborating with GPs to provide out-of-hours services, utilising communications systems, staff resource and transport, with some services providing paramedic support to junior doctors in hospital wards. The progression of GP treatment centres and minor injuries units could provide an alternative for ambulance services rather than transferring patients to A&E departments for conditions such as minor trauma. In addition there may be some conditions that start as emergencies but may not need transferring to either hospital or treat-

ment centres due to advanced skills and treatments now administered by paramedics on scene.

Unfortunately the report on *Urgent and Emergency Admissions to Hospital* by the Clinical Standards Advisory Group (1995) does not appear to have fully appreciated the role of the ambulance service in their classification of definitive care as being 'that which starts in the emergency department'. This despite treatments given by paramedics often being replicated in the Emergency Department for conditions such as Asthma, Diabetes, Convulsions and perhaps most significantly Cardiac Arrest.

The widening role of paramedics

Encouragingly the recent report on *Developing Emergency Services in the Community* (NHS Executive 1996) recommends that it would be useful to increase paramedic judgement skills and for them to have greater independence in choosing the best destination for their patient. This recommendation is reinforced by the report *Opportunities in Emergency Health Care* (NHS Executive 1995) with both reports having strong support from clinicians. This suggests that the project being undertaken by the Mid Glamorgan Ambulance NHS Trust is both credible and necessary.

A new approach

The project focuses on prehospital care clinical standards, primary care and secondary care pathways and how these can be integrated into holistic care pathways. This represents a major proposition, which goes to the heart of clinical responsibility and the roles of the ambulance service and paramedics, therefore the study has been confined to a few circumscribed conditions.

Ambulance services are reliant on clinical support, with all services having Paramedic Steering Committees who oversee the training and development of paramedics and protocols. In order to build on this clinical involvement the trust has established a multi disciplinary clinical effectiveness team, with members drawn from both secondary and primary care, together with commissioners, community health councilís and ambulance staff. The role of this group is to co-ordinate the study and to lead on clinical issues. As the formation of this group comprises of various clinical and non-clinical professionals, with each having different perspectives, a balanced view ensures that any potential ambulance bias towards outcomes is minimised.

A workshop, facilitated by the trust, to discuss the concept of alternative models of care was attended by a mix of health professionals covering a range of health professions, together with non-clinical professionals. These included two A&Econsultants, five GPs, four senior primary and secondary care nurses together with ambulance paramedics. In addition non-clinical professionals included a commissioner, community health councillors and a representative from the Value for

FIGURE 1: A REVIEW OF THE TRUST'S CLINICAL STANDARDS

CATEGORY 1	CATEGORY 2	CATEGORY 3
Asthma	Anaphylaxis	Cardiac Arrest
Diabetes	Bradycardia	Cardiac Arrhythmias
Convulsions	Cardiac conditions without pain	Cardiac pain
Catheter problems	Chronic respiratory conditions	Caissons disease
Psychiatric patients	Epistaxis	Cerebral Vascular Accident
Syncope/fainting	Infectious diseases	Gastro-intestinal haemorrhage
Hyperventilation	Maternity labour	Gynaecological emergencies
	Non traumatic abdominal	Obstetric emergencies
	Ophthalmic emergencies	Acute respiratory emergencies
	Terminally ill	Poisoning/overdose
		Retention
		Sickle Cell disease
		Suspected DVT
		Unconscious patients
		Back pain/Renal colic
		Hyperthermia
		Hypothermia

Money unit. The objectives of the workshop were to assess whether health professionals would support the concept of pre hospital integrated care pathways and to identify those conditions, which in their opinion could be managed alternatively from A&E departments.

Members of the workshop were invited to use their experience and expertise to review the trust's clinical standards as a basis for selecting conditions for further study. Following discussions these standards were sectioned into,

- patients responded to as emergency '999' calls which must be transferred to hospital (classified as Category 3),
- those which may potentially be treated in the community (Category 2) and
- those which they felt definitely could be treated in the community (Category 1), see *Figure 1*.

All trauma, minor injuries and burns were excluded on the basis that these were well researched with the evidence suggesting that these can be treated alternatively in minor injury units, albeit dependant on severity of injury.

Category I conditions were refined using a criterion based on Maxwell's six quality indicators for health care: efficacy, effectiveness, provider outcome performance, acceptability, accessibility and equity.

These quality indicators were incorporated into the development of a 'critical factor' Indicator score as indicated in *Figure 2*,

FIGURE 2 INDICATOR SCORE

Critical factor	Yes	No
Is there an acceptable prehospital or primary care intervention?		
Is the skill required, currently carried out by paramedics?		
Can the skill be learnt?; e.g. Are there special skills required beyond the scope of paramedics? Are special training facilities required?		
Are there acceptable outcome indicators?		
Will there be a potential reduction in mortality/morbidity?		
Is the intervention capable of being measured?		
Is the improvement capable of being measured?		
Can the condition be managed in the primary care setting?		
Is the condition capable of being managed by the patient under normal circumstances?		
Is there an evidence base? e.g. Is the condition well researched?		

which allowed each condition to be weighted by the Clinical Effectiveness Team. This ensured that there was a rationale of a mixture of professional decision-making together with a scientific approach to choosing clinical conditions for advanced study.

Using these criteria enabled five conditions to be selected for further research, Asthma, Diabetes, Convulsions, Psychiatric problems and Catheter problems. These were selected on the basis that they all scored highly against the indicator score; other conditions such as non-traumatic abdominal emergencies and anaphylaxis scored low. Evaluative research will now be undertaken to develop integrated care pathways for these five conditions.

The development of integrated care pathways will consider clinical outcomes and socio-economic factors such as ability to communicate, age and environment, which combined, will enable decisions to be made regarding how the patient can be best managed enabling a decision to be made regarding the most appropriate care pathway.

An initial audit undertaken by the trust suggests that there are sufficient patient numbers to make the research viable. Models of care will then be evaluated and costed using recognised costing methodologies, to determine whether and to what extent the development of integrated care pathways can be incorporated into health care delivery.

A change for the better?

This means moving beyond the traditional processes of responding within Patient's Charter standards, treating and transporting and will undoubtedly have implications for training, medico- legal considerations and contracting. Therefore all of this must be supported by evaluative research and appropriate protocols for care developed in partnership with clinicians if change is to happen.

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Pre-hospital Immediate Care 1999;3:102–107

PERSONAL VIEW

Pre-hospital care five years hence

Malcolm Woollard, David Ellis

The ambulance service has reached a stage in its reasonably short existence when it must take stock of the role that it currently undertakes, and identify the opportunities that exist for it to contribute more fully to health care provision. The pressures on the NHS are now significant for the ambulance service. This is arguably due to its increasing success in establishing itself as a key health provider through the development of paramedics and via its expertise in information and communications technology. The requirement for systems of clinical governance and quality monitoring; the implications of local, primary health care driven commissioning; integrated primary care services; the NHS Direct telephone advice service; and of the new ambulance response standards[1–3] are all necessary agenda items for the ambulance service to consider if it is to enhance its role. This paper represents the personal view of the authors as to how it may respond to these challenges.

Drivers for change

The public perception of the ability of the health service to cure all ills remains unshakeable, as does the belief that any new treatment or technology must inevitably be of benefit. This expectation is fuelled by broad but superficial media coverage of health related issues and through longstanding tradition.

A significant proportion of the public require that developments in the health service are provided at no additional cost to the user (no increase in taxation) and all demand that the NHS remains free at the point of use. This presents a challenge for services that are already fully utilising their resources to ensure better performance standards against a background of increasing cost pressures from purchasers and growing expectations from the general public.

There is a developing insistence that health care be provided on a local basis. This is despite the cost pressure to rationalise and centralise hospital services, driven by a need for greater efficiency and to ensure the availability at a given location of a broad range of specialist medical services. In addition, the proposed reduction in numbers of accident and emergency (A&E) departments, a rise in the number of individuals suffering from age related medical and social problems, and increasing litigation awareness all impact on how the ambulance service must organise itself for the future.

Response of the NHS

The recent white papers *The New NHS. Modern, dependable* (England),[4] *Designed to Care* (Scotland),[5] and *Putting Patients First* (Wales)[6] emphasise the role of general practitioners (GPs) and other primary health care providers in defining the shape and direction of local health services and provide a framework for change.

Cost pressures and progress in technology and pharmaceuticals have resulted in the development of the clinical effectiveness initiative.[7] This aims to move health care towards evidence based practice to ensure that any service development can demonstrably improve patient outcome. While a reduction in mortality is one simple measure of a positive outcome, reductions in morbidity, hospital admissions, bed occupancy duration, and improved quality of life are also of significance. This initiative has in turn resulted in an increased emphasis on the role of clinical audit,[8] both in determining whether staff are compliant to clinical protocols and, more importantly, whether these protocols produce the desired patient benefit. The advances that ambulance services have made over recent years suggest developing clinical audit links with acute and community services would enhance the holistic approach to health care provision.

Ultimately the importance of evidence based health care, developed from best practice, has been emphasised by the emerging concept of clinical governance. This places the responsibility on the shoulders of chief executives and managers of trusts for ensuring that high standards of patient care are delivered. In this regard the white papers detail the formation of two significant organisations: the National Institute for Clinical Effectiveness, which will be responsible for establishing national service frameworks, and the Commission for Health Improvement, which will have the responsibility for monitoring the quality of services provided to patients.

The drive for greater efficiency in the face of rising demand has resulted in increasing pressure to target resources across a limited front. In a small number of high profile cases this has led to rationing or restrictions in the services that health authorities choose to provide locally.

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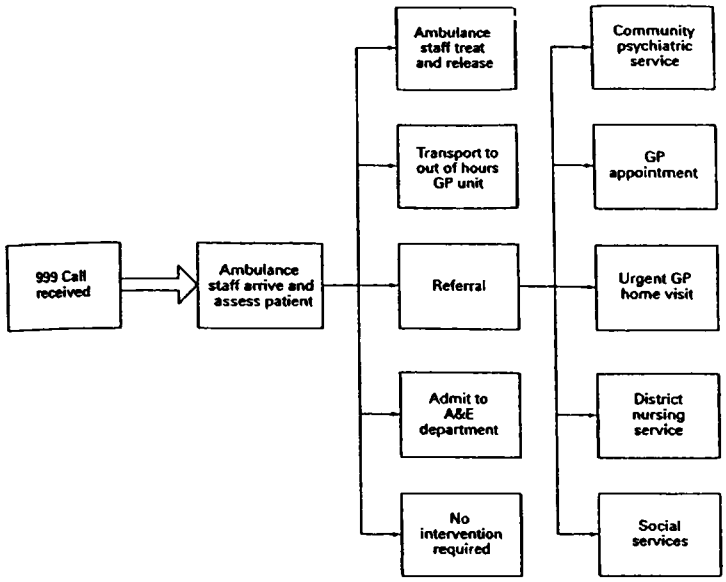

Figure 1 Outcomes of on scene triage by ambulance staff.

Certainly, the emphasis is gradually shifting away from patients having a right to choose how and where they access the health service. An alternative is a system of triage, utilising professional expertise, to ensure patients receive the right level of care, in the right place, within an appropriate time frame, and according to their clinical need.[9 10] The NHS Direct telephone advice service pilot sites provide a working example of this latter approach. Their original aim was to reduce inappropriate requests for out of hours GP visits and A&E department attendance.[11] This concept has rapidly evolved and it is now envisaged that NHS Direct will become the gatekeeper for all access to health services to ensure that, from the first point of contact, only that type of care will be utilised which can most efficiently resolve a patient's problem.

The white papers and the green paper *Better Health, Better Wales*[12] emphasise the importance of self help. This change in the culture of society must be guided and supported through initiatives such as the NHS Direct advice service.

Opportunities and implications for the ambulance service

Primary care providers will form the lead bodies that determine the future shape and type of health care provision. While the ambulance service has always been perceived as a component of the secondary care system, when the nature of the work it undertakes is examined this view defies common sense. The ambulance service is the first point of contact for over 70% of the "emergency" patients which it transports,[13] the bulk of whom request assistance for medical and social (rather than injury related) problems. The remainder of the emergency ambulance service's workload consists of requests for care and transportation from GPs who have themselves visited patients with an acute or exacerbated chronic condition in the community. While the non-emergency patient transport service is currently contracted for by secondary care providers, much of its outpatient workload is also generated by GPs. It can, therefore, be argued that the majority of the work of the ambulance service is linked firmly with primary care.

It is vital that the ambulance service capitalises on these links in order to expand its role. As the first point of contact for upwards of 70% of the emergency patients it transports, its staff determine where these individuals are taken to. Currently, almost all are transported to A&E departments mainly due to a lack of suitable alternatives. Two independent studies show that at least half of the patients admitted by ambulance as a result of a 999 call are discharged with no referral.[14 15] While these studies review admissions to A&E departments serving inner city areas, the authors would suggest that their findings are generalisable to most hospitals, at least as an indicator of a trend if not in absolute terms. Greater integration with primary care providers would allow for joint development of agreed clinical guidelines, providing ambulance staff access to a range of primary care services and skills; supporting transportation of patients to alternative locations (such as out of hours surgeries or minor casualty units); referral to appropriate agencies for home based care; or allowing ambulance staff to "treat and release" patients (see fig 1).[16]

Such an approach risks shifting some of the financial and resource burden from secondary to primary care. However, it would also mean fewer patients being unnecessarily transported to A&E departments. This would free these facilities to meet rising demand, and allow the ambulance service to target its resources more effectively to those patients with the most urgent medical need.[17] In rural areas ambulance transport times to fully equipped and staffed A&E departments can exceed 30 minutes, resulting in the vehicle and crew being out of their operating area for over an hour. This has implications for response standards in that area and brings pressure to increase resourcing in areas of low demand, to facilitate response time targets being met. However, if the many patients who do not require the resources of a fully equipped A&E department could be treated locally, this would keep ambulances closer to their normal area of operations and result in shorter journey times. It would also free up these expensive resources more quickly to respond to the next call. This thinking is emphasised in the recent value for money study undertaken by the Audit Commission,[18] which recommends that a sensible step may be to assess emergency calls and provide a range of responses that recognise patients' differing needs. This will be dependent on more research, education, multiagency working, and investment in communications technology.

While such a strategy may provoke concern among GPs regarding potential increases in their workload, this could be offset by a number of additional proposals. By working closely with GPs to develop telephone triage protocols, it will be possible to reduce the number of house visits made by GPs to

patients who are subsequently admitted by ambulance to hospital. Instead these patients could be identified as requiring the immediate attendance of an ambulance alone, reducing the cost arising from a dual response and freeing the GP for other work. An extension of this approach may involve the provision of appropriately skilled "community paramedics". These could, on a GP's behalf, attend selected house calls to conduct initial triage and communicate the results back to the physician, thus allowing the patient to be directed to the most appropriate form of care.[19] This would require close cooperation between ambulance services and GPs and could, perhaps, be best facilitated via the provision of telemedicine links (see fig 2).

There is some limited evidence that GPs are prepared for paramedics to undertake this work on their behalf.[20] Undertaking such a role would, however, require an extension to the current paramedic education programme in order to provide staff with the underpinning knowledge necessary to effectively fulfil this task. It could be argued that community nurses already have the skills needed to perform this function. An alternative view would be that, if the patient has a condition requiring immediate advanced life support, paramedics could provide this as part of their normal skill base. This would not, in most cases, be true for community nurses. It could also be argued that district nursing services are already overburdened and, particularly in rural areas, are under-resourced. Ambulance services have ready access to the expertise and infrastructure necessary to establish the communications link with GPs that would form a vital part of this proposal. Further, a number of paramedic degree courses are being implemented around the UK, some with nursing input, and these could be utilised to fill the identified knowledge gap.

It will be particularly important to continue the development of joint out of hours services. Not only have these markedly reduced home visits by GPs, they have also formed a sound basis on which to explore how links between ambulance services and GPs can be exploited in the interests of all parties, and particularly to the benefit of patients. The ready availability of out of hour surgeries will potentially reduce inappropriate attendance at A&E departments and demand on the 999 ambulance service. Provision of transport to such centres by non-emergency ambulance vehicles forms a vital (and cost effective) part in ensuring easy access for those patients who do not have the financial resources to provide their own transport, or for those who are medically unfit to utilise other types of vehicle.

Particularly in rural areas the ambulance service has the potential to fill gaps in absent or under-resourced community nursing services. Additional training (and most importantly education) for paramedics would enable them to provide the clinical care which, by its current absence, mandates that patients are resident in hospitals rather than at home. Clearly, there is a risk that other primary care professions may feel threatened by such proposals and this can only be eliminated by joint development with these groups.

The ambulance service also has the ability to provide community based services that until now have been provided by no other group. For example, it is common for a non-emergency ambulance in a rural area to be tasked to transport patients to a haematology service some 40 miles away, simply to allow blood samples to be obtained. It would make greater economic and social sense for a paramedic to visit each patient at home, take blood and transport the *samples* to the laboratory. This would have the added advantage of ensuring that this paramedic is available for emergency responses in the area they serve. Similar principles could be adopted for the checking of newly applied plaster of Paris splints, or the monitoring of patients discharged home with minor head injuries. Again, it could be argued that community nurses may also undertake these tasks. Clearly, however, in those areas where these patients are being transported to hospital for such checks, they are not doing so. As has been argued previously community nursing services are already stretched, whereas ambulance services, particularly in rural areas, do have spare capacity. A critical number of ambulances must be dispersed across any geographical area in order to ensure reasonable response times to the local population. In rural

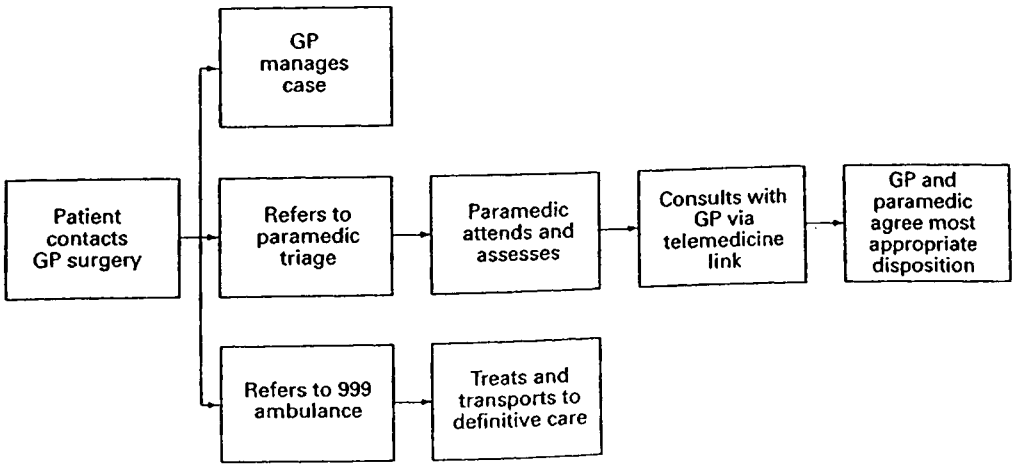

Figure 2 Managing GP workload.

areas this requires an economic balance to be struck between response times and utilisation rates. Fewer ambulances mean higher utilisation rates and lower costs but longer response times, and vice versa. Subsequently, there is spare capacity in rural areas, and strategies such as the one outlined here could increase utilisation rates without jeopardising response times, provided the crew are only tasked to work within an appropriate area. Rapid response paramedic units, positioned in rural areas to facilitate achievement of the new ambulance response standards, will inevitably also suffer a low utilisation rate. Adoption of additional "community paramedic" duties as described here will assist in making such units far more cost effective. Telemedicine may contribute to this development in allowing paramedics to access specialised clinical guidance. The medicolegal implications of paramedics assuming additional clinical skills must be carefully considered. These initiatives, and proposals for the introduction of triage protocols allowing non-transportation of certain patients, will require the development of clinical judgment. This can only be achieved through an evolutionary advance in the selection and education of ambulance staff.

Managed health care

The key to enabling patients to obtain the right level of care, at the right facility, within an appropriate time frame, according to their clinical need, and regardless of the time of day when they seek help, is the rapidly evolving NHS Direct telephone service. Logically, this should fit naturally into the role of the ambulance service, given its current expertise with emergency triage systems and communications technology. However, while the ambulance service is a natural choice to provide the infrastructure, this type of facility must be staffed by nurses utilising established protocol driven decision support systems. This helps to reduce the risk of inappropriate triage decisions being taken[21 22] and the subsequent threat of litigation.[23 24] Such systems can, however, be effective in reducing the workload of GPs[25] and in particular the number of home visits they make.[26] This type of service is popular with both GPs[27] and patients.[25] The white paper's principles of integrated care, improved partnership arrangements, and the elimination of competitive contracting will aid in overcoming barriers to the implementation of such integrated systems.

Acting as the first point of patient contact and as a link between service providers will enable the ambulance service to expand its role as a provider of telecommunications services. Ready access to patient data and voice communications from remote sites will become of increasing importance to carers. This in turn will require the development of a single patient record allowing simple but secure access for a wide range of health care professionals. The use of the NHS patient number will be integral to achieving this aim and as such the ambulance service must explore its utilisation as a component of its own patient records.

Health maintenance

Inevitably, funding will be linked very closely with projects that are directed at meeting health gain targets,[28] and the ambulance service should actively seek opportunities to expand its role in these areas. While the potential for ambulance trusts to contribute to reducing deaths from heart and respiratory disease, deliberate self harm, and accidents is clear, they could also become active participants in the health promotion arena. Fire brigades have been very successful in reducing the incidence of fires through the provision of public education, premises inspection, and advisory services. A similar role could be developed for ambulance services by working with health promotion experts to provide public education in accident prevention and initial medical care, inspecting commercial premises to monitor arrangements for first aid, and offering advice to a range of private and public bodies on the provision of equipment, training, and personnel. This could be further expanded, in cooperation with other health care professionals, to include walk-in clinics at ambulance stations where simple checks could be offered. These might include blood pressure and cholesterol measurements, and provision of advice on correct diet, exercise regimens, and how to stop smoking. Clearly it would be necessary to involve health economists in the development of proposed changes and it is not suggested that such a service could be financially viable in all areas. However, in rural locations, utilisation rates for ambulances are low and the use of standby points is less appropriate, as stations are situated in small towns with long distances and very low populations between them. Subsequently, rural stations are often "staffed" for long periods of time. And in urban areas, the station itself may provide a useful resource which other health maintenance workers may wish to utilise from time to time.

Clinical effectiveness

Whatever initiatives are implemented, in order to attract funding for developments and to maintain current services it is vital that clinical effectiveness is demonstrated. The ambulance service must build on its initial work in clinical audit to provide clear evidence of what does and does not influence patient morbidity and mortality. This will require the development of links with hospital information systems to determine how the treatment initiated in the out of hospital phase effects a patient's eventual outcome at and beyond discharge. Audit is only able to determine if *existing* treatment protocols are appropriate, and a sound research and development programme will also be essential in testing alternative models of care for patient benefit and cost effectiveness.[29] A clinical effectiveness programme provides an ideal basis for benchmarking performance and provides an opportunity for the development of more relevant contracting currencies.

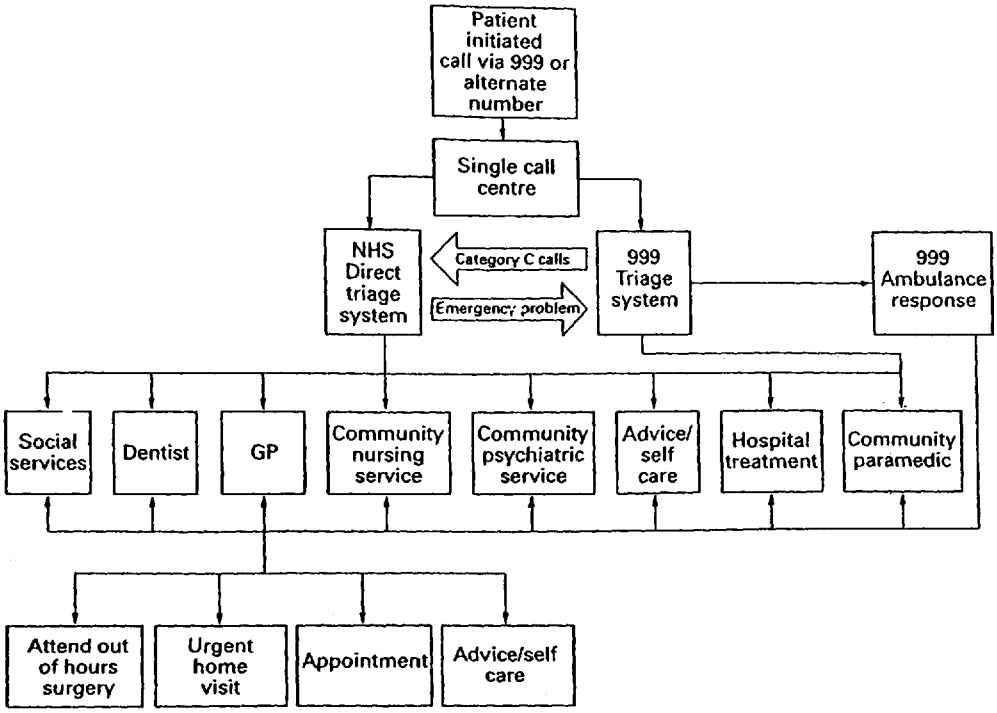

Figure 3 A model for patient flow in an integrated out of hospital care system.

One outcome of a clinical effectiveness and audit programme will be the development and constant revision of care pathways which define not only the clinical intervention to be provided, but also the optimum time points at which these interventions should take place and the most appropriate disposition for the patient.[6] Definition of critical time points for each clinical intervention will result in a gradual differentiation between the care provided by rural and urban ambulance staff. For example, the well researched requirement for early administration of thrombolytics may require that they be given in the ambulance in rural areas when journey times are prolonged. However, in urban areas, where travel times are much shorter, these drugs may be more appropriately administered in the A&E department. Care pathways, jointly developed with a broad range of health care providers, would also aid in ensuring that patients are managed *where* it is most appropriate. Patients with insulin dependent hypoglycaemia need no longer be automatically directed to an A&E department. In one review, it was found that in excess of 40% of hypoglycaemic patients who recovered after paramedic initiated treatment subsequently refused hospital admission (T Jones, unpublished data; South and East Wales Ambulance Service NHS Trust, 1997). These patients currently risk falling through the primary health care monitoring net. However an appropriate care pathway would require the attendance of a nurse specialist from the GP practice after paramedics had corrected the blood glucose concentration. A similar approach could be implemented in the management of confirmed epileptics who have had a single uncomplicated fit in the out of hospital environment. Such an approach has the benefit of freeing ambulances more rapidly, thus reducing pressure to increase resourcing to meet higher demand and new (more challenging) response standards. It has the advantages of avoiding unnecessary journeys to hospital for patients and keeping the primary care system informed about adverse events, ensuring appropriate care is provided in an integrated and timely manner.

Hospital care

The reduction in junior doctors' working hours also provides an important opportunity for the ambulance service. Paramedics already possess some of the simpler technical skills practised by junior doctors, such as intravenous cannulation and management of cardiac arrest. Secondment to appropriate hospital departments may be supported by the medical profession in reducing their burden. This would provide an ideal opportunity for paramedics to enhance their existing skills, particularly if they are normally based in areas with low call volumes. It would also allow ambulance staff the opportunity to develop additional skills relevant to an expanding role in primary care, such as patient assessment in the non-acute situation and clinical interventions such as urethral catheterisation.

Organisational structures

Structures must support the current and developing roles of the service and the key measure of quality of care. Individual staff are the final arbiters of the quality of service provided, and so the responsibility for measuring and correcting this should be positioned as close to the provider level as possible by creating clinical supervisors. Local monitoring of the manageable components of response times, such as crew mobilisation and hospital turnaround times, coupled with supervisor led clinical audit and peer review of patient

management strategies, will be essential in building quality systems.

Staff must become increasingly flexible as they undertake new roles. In order to encourage cooperation and active participation it will be essential to place responsibility for determining working conditions at the lowest possible level. For example, while logisticians will determine the number of ambulances necessary to meet the call demand for a given time of day, the team of staff responsible for staffing each vehicle should be allowed to determine their own shift patterns to match this resourcing need. Tradition and archaic working practices must not be allowed to inhibit change.

The organisation of middle management must reflect the structure of the emerging primary care led health service and geographical areas of responsibility are therefore likely to have boundaries in common with those of primary care and local health groups.

Conclusion

The implementation of the strategies in this paper will enable the ambulance service to contribute more effectively to health care provision by increasing its integration with primary and other health care services (see fig 3).

It is recognised that these proposals will have a significant impact on educational, communications, and operational activities. However failure to adopt a progressive and proactive stance in developing the role of the ambulance service risks its true potential being overlooked by commissioning organisations. This is not to say that the ambulance service should seek to supplant existing health providers, but rather to find ways in which it can complement or contribute to their role. This paper has also described a number of gaps in current service provision which the ambulance profession could potentially fill. A lack of clear evidence demonstrating the clinical effectiveness of current ambulance service models and treatment protocols jeopardises maintenance of funding levels in the future, as cash becomes increasingly limited and purchasing priorities are directed to other areas of the health service. Indeed, the real danger is that funding for current paramedic training and service developments may become restricted and that subsequently the ambulance service will devolve once more into a transport organisation.

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Are prehospital care pathways a viable proposition?

David Ellis

ARTICLE POINTS

1 Paramedics' skills are continually increasing, but are potentially underused.

2 Hypoglycaemic patients can be transferred to accident and emergency departments inappropriately.

3 Prehospital care pathways could provide an alternative to secondary care.

4 An integrated approach may be both clinically and cost-effective.

5 The effectiveness of care pathways can be evaluated against predetermined clinical and non-clinical criteria.

KEY WORDS
- **Prehospital care pathway**
- **Hypoglycaemia**
- **Paramedics' skills**
- **Resource implications**

Introduction
There is debate as to whether all patients suffering from hypoglycaemia need to be taken to hospital. Several studies suggest that rapid transfer to hospital may not be appropriate or cost-effective, and that these patients could potentially be managed in the primary care environment. One way to achieve greater efficiencies within ambulance services could be through the adoption of an integrated care pathway as an alternative to secondary care. A prehospital care pathway is suggested for dealing with patients who present with hypoglycaemia.

Patients suffering from hypoglycaemia who present to the ambulance service through the '999' system usually find themselves being transferred to accident and emergency departments because of a lack of alternatives. Several studies suggest that rapid transfer to hospital may not be appropriate, and that these patients could potentially be managed in the primary care environment (Billittier et al, 1996; Weston, 1990; Snooks, 1998).

This article suggests that the development of care pathways which integrate the ambulance service may provide a solution to the problems with current practice.

Ambulance services

It has become increasingly clear over recent years that the standard treatment response by the ambulance service is inappropriate for many patients for whom a '999' call is made (Snooks, 1998).

Traditionally, ambulance services have been regarded mainly as transporters of ill or injured people to hospital. Ambulance crews have, of course, always provided essential and often life-saving interventions at the scene and during the journey to hospital. The focus, nevertheless, has been on their function to deliver patients to hospital, with response standards being the only measure of effectiveness.

Recent technological advances and improvements in paramedics' skills raise the question of whether such a focus is still appropriate (Snooks, 1998; Nicholl, 2000).

More seriously, it has been suggested by Nicholl (1996) that the current system of automatic dispatch of an ambulance to every emergency call, followed by the mandatory transfer of the ill or injured patient to hospital, regardless of his/her condition, is directly contributing to inefficiencies in service delivery through the wasteful use of scarce resources.

It is important to note that although it is mandatory for every emergency call to receive a response, the transfer of patients to hospital is only mandatory by virtue of the fact that no alternative means of accessing a more appropriate aspect of the healthcare system is available to crews.

Many callers to the '999' system do not require the 'lights and sirens' response of a paramedic-staffed ambulance, which can result in some patients being taken to an accident and emergency department unnecessarily (Brown, 1993; Billittier et al, 1996).

Research elsewhere is challenging the automatic dispatch rule by examining the effects of introducing systems of triage, in which ambulance control staff categorise calls according to predetermined criteria, and then ensure that an appropriate resource is dispatched (Nicholl, 1996).

There is increasing recognition of the professionalism of paramedics as prehospital care providers, and this is reflected in the increase in the intersectorial collaboration

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developing with secondary care clinicians, and more recently with primary care providers. This suggests that alternatives to existing models of care can be found that will not only benefit patients, but may also free resources. This would keep pace with the shifting notion that health care should be delivered in the community. The drive for greater efficiency in the face of rising demand has resulted in increasing pressure on healthcare providers to target resources across a limited front in all aspects of healthcare delivery.

Integrated prehospital care pathways

One way of achieving greater efficiencies within ambulance services could be through the adoption of the care pathway process which is currently spreading through hospitals and primary care throughout the UK.

An integrated care pathway defines the optimum care process, sequence and timing of interventions by doctors, nurses and other healthcare professionals for a particular diagnosis or procedure. Although integrated care pathways are a relatively new clinical process improvement tool, they are currently being used in hospitals in the USA, Australia and the UK (Cheah, 1998); however, they have yet to be introduced into prehospital care.

The development of integrated care pathways is dependent on the collaborative efforts of all those involved in the care of the patient. This can include clinicians, nurses, pharmacists, physiotherapists, paramedics and any other allied healthcare professionals. The common aim is to improve the quality of patient care.

The methodology and objectives of integrated care pathways are consistent with those of total quality management and continuous quality improvement. Quality in the context of effective health care can be a confusing concept; the most widely known framework for assessing quality in health services is Donabedian's model of structure, process and outcome (Donabedian, 1980).

In this model:

- Structure refers to the physical and organisational setting and available resources for providing health care
- Process refers to what is done to the patient in terms of advice, diagnosis, treatment and aftercare
- Outcome relates to the change in the health of the patient.

Hypoglycaemic patients

Patients who become hypoglycaemic are arguably ideally suited to prehospital care pathways. Whether all patients suffering from hypoglycaemia need to be taken to hospital or to be admitted after examination is currently debated.

Studies of the treatment of hypoglycaemia by Weston (1990), Yaxley (1991) and Steel (1992) have demonstrated that glucagon or glucose administered by ambulance staff resulted in a significant improvement in the patient's condition. This adds weight to the argument that there may be alternatives to accident and emergency departments for these patients. There have also been several studies which suggest that patients, particularly those suffering from hypoglycaemia, can be adequately managed either in the home or in a community setting (Weston, 1990; Yaxley, 1991; Nicholl, 2000).

Already, several services are developing local protocols for dealing with patients with hypoglycaemia. However, among ambulance service protocols in the UK, it is still more typical for patients who have experienced a severe hypoglycaemic event to be transported to hospital for supervision or further treatment. It could be argued that this is because

PAGE POINTS

1 Alternatives to existing models of care can be found which will not only benefit patients, but may also free resources.

2 An integrated care pathway defines the optimum care process, sequence and timing of interventions by doctors, nurses and other health care professionals for a particular diagnosis or procedure.

3 The development of integrated care pathways is dependent on the collaborative efforts of all those involved in the care of the patient.

4 Patients who become hypoglycaemic are arguably ideally suited to prehospital care pathways.

In the UK, patients who have experienced a severe hypoglycaemic event are typically transported to hospital for supervision or further treatment.

Figure 1. Example of a '999' diabetes care pathway.

999 Call dispatch criteria

Ask caller if patient is/has (been):

- Unconscious or not breathing
- Severe difficulty in breathing
- Fitting

If any of the above exist:

Respond crew priority A (life threatening)

- Decreased level of consciousness
- Fainting
- Chest pain
- Unusual behaviour/acting strange
- Sweating

If any of the above exist:

Respond crew priority B (serious)

Pre-arrival advice

- If possible, establish whether patient is diabetic

If patient is unconscious and breathing normally:

- Instruct caller to lay patient on side
- Continue to check for normal breathing until help arrives
- Watch for the rise and fall of the chest
- Place your cheek next to the nose and mouth and listen and feel
- If the patient stops breathing and vomits, call back immediately
- If patient is responsive and able to accept fluid, give juice with sugar (2–3 tablespoons)
- Gather the patient's medication

Can someone meet the ambulance?

On-scene treatment protocol

On arrival at the scene:

- Assess the patient (check for Meditag identification)
- Position the patient to protect airway
- Administer oxygen
- Measure blood glucose level

If the blood glucose level is below 4 mmol/l:

- Give oral glucose if the patient's level of consciousness is such that the patient is able to swallow
- Administer glucagon if the patient is unconscious or very aggressive because of the hypoglycaemia; alternatively, 50% glucose may be given intravenously
- Reassess the patient
- Retake the blood glucose level

Treatment time should not exceed potential time to hospital

Clinical criteria

If you can answer 'yes' to any of the following, consider transportation to hospital or treatment centre:

- Is this a first episode?
- Is there a predisposing medical condition?
- Is the blood glucose reading outside the range 4–10 mmol?
- Is the Glasgow Coma Score <15?
- Has the patient been drinking alcohol or taking drugs?
- Are there abnormal electrocardiogram (ECG) rhythms (taking 12-lead ECGs)?
- Is the patient <16 years of age?

If answers are negative, consider non-clinical criteria

Non-clinical criteria

Does the patient live with a competent adult or can someone be contacted easily to stay with the patient?

If 'yes,' explain to the patient and relatives that transfer to hospital is not necessary, contact GP/diabetic nurse or community nurse and arrange for them to call within an agreed time. Advise patient and leave in care of competent adult. Advise patient to contact NHS Direct for further advice

If 'no', transfer to hospital or treatment centre

of a lack of alternatives rather than because it is the best course of action for the patient. For rural services with turn-around times in excess of three hours, this has serious resource implications.

Services that have developed protocols that allow for the fact that some patients may choose to stay away from hospital have developed a 'discharged from care' protocol that is dependent on the paramedics receiving answers to a number of pre-defined questions (Snooks, 1998).

Prehospital care pathway design

Figure 1 outlines a suggested design of a prehospital care pathway. This considers issues such as clinical risk, the role of paramedics and factors that are deemed appropriate to the ambulance service, such as:

- Receipt of call and pre-arrival advice
- Dispatch criteria in accordance with new response standards
- On-scene management treatment in accordance with both nationally accepted protocols and those determined locally be paramedic steering committees
- Clinical criteria, such as:
  - Is this the first episode?
  - Is there a predisposing medical condition?
  - Is the blood glucose reading outside the range 4–10 mmol?
  - Is the Glasgow Coma Score <15?
  - Has the patient been drinking alcohol or taking drugs?
  - Are there abnormal electrocardiogram (ECG) rhythms (using a 12-lead ECG)?
  - Is the patient under 16 years of age?
- Non-clinical criteria, such as:
  - Does the patient live with a competent adult, or can someone be contacted easily to stay with the patient?
  - Does the patient have the capacity to understand?

Conclusions

The introduction of integrated care pathways will clearly have resource implications. Although it has the potential to save the ambulance service unnecessary journeys to hospitals, there is the possibility of an increase in primary care workload. The introduction of prehospital care pathways for several clinical conditions would require an extensive examination of how resources are used and distributed in the prehospital environment, which may well impact on existing contractual arrangements.

However, a greater awareness of ambulance service potential, together with the development of partnerships with other health professionals and commissioners, will ensure that the component parts required to measure effectiveness can be developed into an acceptable framework. This would enable the development of cohesive care pathways that are both clinically and cost-effective.

Particularly relevant is the setting of explicit objectives between managers and other healthcare professionals regarding what needs to be achieved, while ensuring an explicit quality definition. Together these components will form the basis for ensuring the effectiveness of care pathways, which can be evaluated against set clinical and non-clinical criteria.

It is recognised that there are several unanswered questions, such as resourcing, medical and legal implications and training. However, it is suggested that care pathways developed through a multidisciplinary approach involving all healthcare professionals will provide ambulance services with alternatives to transferring patients to accident and emergency departments, and will better serve our patients. ■

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PAGE POINTS

1 The introduction of prehospital care pathways for several clinical conditions would require an extensive examination of how resources are used and distributed in the prehospital environment which may well impact on existing contracting arrangements

2 Care pathways developed through a multidisciplinary approach involving all healthcare professionals should provide ambulance services with alternatives to transferring patients to accident and emergency departments, and will better serve our patients